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ABOUT THIS MONTH'S AUTHORS

JOHN A. BECKETT

An Appraisal of Direct Costing. Mr. Beckett is Assistant Professor of Accounting in the Department of Business and Engineering Administration at Massachusetts Institute of Technology, Cambridge, Mass. He is a Certified Public Accountant and a previous contributor to the Bulletin, as well as author of articles which have appeared in other professional publications. He is vice president of Boston Chapter.

HENRY W. HANLEY

Production Management Is Serious Business. Mr. Hanley is Plant Manager, Montrose Division, Bendix Aviation Corporation, South Montrose, Pa. He has occupied this position since August, 1942. Prior connections in Mr. Hanley's 20 years' experience in the field were with Otis Elevator Company, Worthington Pump and Machinery Company and the Eclipse-Pioneer Division of Bendix.

CHARLES D. ELDRIDGE

Idle Machine Time. Mr. Eldridge is a Professional Engineer, Louisville, Kentucky. He has had seventeen years of varied industrial experience in engineering, production, and maintenance.

BEN C. WHITE

Stores Accounting in the Veterans Administration. Mr. White is a Systems Accountant on the staff of the Accounting Systems Division, United States General Accounting Office. He is a Certified Public Accountant and a member of the Bar.

A. A. KASPER

Budgetary Control Works at Square D Company. Mr. Kasper has been Assistant to the Executive Vice-President and General Manager of Square D Company, Detroit, Mich., as well as Budget Director, since 1945. Prior to this period he was associated with Fruehauf Trailer Company as a staff assistant to the Vice-President and Controller. Earlier Mr. Kasper held various industrial accounting positions with Nash Kelvinator Corp., Bull Dog Electric Co., and Borg Warner Corp., Norge Division. He is also a former contributor to the *N. A. C. A. Bulletin.*

H. C. ARNOLD

Simplifying the Detail Side of Expense Control. Mr. Arnold is Senior Budget Engineer at the Camera Works Division of Eastman Kodak Co., Rochester, N. Y. He has been connected with the company for nine years, and formerly was with the Dennison Mfg. Co. in Framingham, Mass. Mr. Arnold graduated from Harvard in 1937.

WILLIAM J. TAGTMEIER

Forecast Budgeting for a Multiplant Operation. Mr. Tagtmeier has been Budget Supervisor, Deere & Co., Moline, Ill., since 1944. In public accounting with Haskins & Sells, Chicago, Ill. from 1942 to 1944, he was with Autopoint Company for the preceding five-years period and was in charge of standard costs with that company from 1940-1942.

A. WINSTON SYKES

Performance Budgeting in Municipal Government. Mr. Sykes is a Certified Public Accountant and is Budget Officer of the City of Norfolk, Va. He is Chairman of N.A. C. A.'s Committee on Governmental Accounting and a member of the American Institute of Accountants and of the Municipal Finance Officers Association.

Corrections—It has been pointed out that the phrasing of the biographical note relative to Dr. S. Paul Garner, 1951 President of the American Accounting Association, in the *N. A. C. A. Bulletin* for November 1951, especially the erroneous use of the word "recently," might lead to confusion of his term of office with that of the 1952 President, Dr. George R. Husband who was chosen in September.

In "Research Accounting In An Oil Company" by Hugh Connolly, in the *N. A. C. A. Bulletin* for November 1951, the line on page 316 which starts "Our company is" represents a slug incorrectly inserted after proofs had been passed. It should read, "Our cost accounting starts with time records required from all employees."

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An Appraisal of Direct Costing

by JOHN A. BECKETT

Assistant Professor of Accounting, Massachusetts Institute of Technology, Cambridge, Mass.

Following mention of a few of the authors whose writings have dealt with direct costing during the past twenty years or so — and indicating that other recent writers have frequently touched on the theory at one or more points — the present author proceeds to describe direct costing and to state the principal pros and cons to be associated with the method, as contrasted with "full" costing. He discerns some superiority for direct costing in connection with two of three principal uses of accounting.

IF ACCOUNTANTS WERE TO ASK THEMSELVES, "Is there any area in which the traditional and time-honored premises of accounting are challenged?", they might very probably come up with the answer, "Yes, there is such a challenge in the theory of *direct costing*." For such is the message of the theorists and practitioners who for a good many years now have been proposing what they have been wont to call a new theory of accounting.

Some Who Have Sparked the Idea

Before the details of direct costing are discussed, it may be helpful to view the subject historically, to discover its sources, and to give proper recognition to those who have given it the impetus which has brought it to its present status. Credit for its development most frequently goes to Jonathan N. Harris who, as Comptroller of the Dewey and Almy Chemical Company, found that the results of orthodox standard cost accounting had a tendency to confuse the management of his company which has since grown to be one of the leaders in the chemical and rubber industries. Mr. Harris first conceived his idea in 1933 and has published a number of articles on the subject since that time. He is still the primary exponent of the plan, although there are now quite a few others who have carried forward its principles and have undertaken their adoption in numerous industrial concerns throughout the nation and, in fact, the world.

Subsequent to Mr. Harris' initial expositions, Clem N. Kohl, writing in the N. A. C. A. *Bulletin* of July 1, 1937, critically raised some questions about orthodox accounting principles in his article entitled, "What is Wrong with Most Profit and Loss Statements?" Further substantial impetus was given to the idea through an article by Cecil L. Clark of the Sangamo Electric Company, Springfield, Illinois, entitled "Fixed Charges in Inventory" which appeared in the *N. A. C. A. Bulletin* for April 15, 1947. There are others who have tackled the subject. G. Charter Harrison, in a series of articles entitled "New Wine in Old Bottles", showed in 1937 why he felt that conventional procedures of accounting needed overhauling. The relevant article in that series was called "Why Most Profit Statements Are Wrong". In January, 1951, Waldo W. Neikirk, a colleague of Mr. Harris, writing in the *N. A. C. A. Bulletin,* demonstrated the practice and method of direct cost accounting as employed in his company, and weighed its merits in one particular situation.

This is far from a complete, bibliography on direct costing. However, it indicates that the question has been raised in a number of quarters, "Are orthodox accounting procedures likely to be misleading to management and, for that matter, to the many outside audiences which gain their picture of business success or failure through the accounting reports which we prepare?" For this reason, let us look at the theory of direct cost accounting to see what it is and how it differs, if at all, from the orthodox methods which we have honored since accounting became the valuable art that it is in the industrial economy.

The Distinction on Which Direct Costing Is Based

It is quite clear from the titles already mentioned that, as a group, the exponents of this theory feel that something is wrong with the way profits are determined under the conventional method. They ask "Are profit reports wrong?" and "What is wrong with the way accountants compute profit?" And they come up with the uniform answer, "The procedures of orthodox accounting are fallible and misleading, and tend to confuse the person who heads resulting statements." Furthermore, these authors assert that the trouble arises from a failure in conventional accounting to recognize the nature of costs and the significance of their behavior. This is a serious charge. What lies behind it?

The principal thorn in the side of the advocates of direct cost accounting is the alleged fact that in conventional accounting no distinction is made in financial reports between costs of producing and costs of being ready to produce or being capable of producing. What does this mean? To the exponent of direct cost accounting, it is important to draw as clear a line as possible between the costs which are the immediate results of current productive activities and the costs

which result from the presence and availability of the productive capacity which makes this current production proximately possible. The distinction, they concede, is not absolutely or perfectly attainable in practice. However, they regard this fact as not having an important bearing on the general philosophy. It is, in fact, true that the lack of perfection in achieving this cost segregation has not been a bar to its adoption in many actual business situations, so we need spend no time debating and exploring the matter here.

The importance given the distinction in this: those costs which result from current productive effort are admitted by the direct cost accountant to be product costs, that is, inventory costs. But those costs which result from the long-term presence and availability of productive potential are said to be period costs, that is, *not* inventory costs but costs which should be, because of their nature, charged as expense on profit and loss reports. This is the principal thesis of a direct cost accounting. Indeed, direct cost accounting has been charaterized by Mr. Harris as,

> "regular standard cost accounting, after an operation for chronic appendicitis. The useless appendix, known to many readers as unabsorbed or overabsorbed factory burden, has been eliminated. By this operation, standard cost accounting acquires ability to provide management with truthful income statements where before the real results were obscured by technicalities."

These words clearly set forth the issue. "Old time" accounting is said to be "old hat" in that it fails to make a proper distinction between period costs and product costs. Further than that, the failure to make such a distinction is said to obscure the truth. Only when the distinction is made, can the "real" results be known. However, it is pointed out that to make the distinction is not ordinarily complicated. The mechanics of direct cost accounting are theoretically quite simple. Material, labor, and variable overhead costs are grouped, broadly, into the category of product costs. Fixed overhead costs, on the contrary, are separated out and classified as period costs which, as has been noted, are not assigned to inventory at all but are charged against the period in which they are thought to occur.

One author, not yet mentioned, has borne down heavily on the point. Philip Kramer, writing in the *N. A. C. A. Bulletin* for January 15, 1947, in an article entitled "Selling Overhead to Inventory" has set forth some very persuasive arguments in favor of this distinction. He asserts that,

> "the chief advantage of the omission of fixed overhead expenses from inventory pricing is, . . . the segregation of the effect on costs of management's long-range policy decisions from current operating decisions. With such separation, it is possible to present more useful information to management—particularly in connection with interim income statements. It is important to note also that the regular valuation of inventories on a variable or out-of-pocket basis provides readily available data to facilitate choice of product and pricing alternatives."

Well, what—more specifically—are the long-run and the short-run costs? The long-run costs—the costs of maintaining the capacity and ability to produce—are, of course, primarily the costs of ownership. They include the costs which hold over for many operating periods subsequent to the decision to acquire capital assets. These are the costs about which nothing much can be done currently, the expenditure having been sunk and irrevocably made at some perhaps long-past date. Depreciation is, of course, one such cost, but there are others. Cost of occupying buildings, standby charges, skeleton factory staff salaries, property taxes, insurance, and perhaps some others are considered to be costs of *being prepared* to manufacture goods.

Advantages Claimed When Direct Cost Accounting Is Used

It is customary for direct cost accounting advocates to point out that the inclusion of these latter costs in inventory can produce what appears to be an anomalous situation, one in which there is a loss in a period of high volume of sales following a profit in a period when sales were a good deal lower. This is possible, of course, when fixed charges have been assigned to inventory when production was curtailed and the relatively high inventory cost is, therefore, carried forward to the disadvantage of the period in which the goods are sold. Such an instance appears to lend strength to the assertion that orthodox accounting is misleading and erroneous. Even if capacity costs are not charged to inventory, they are often, in the direct cost accounting illustrations (of conventional cost accounting), shown as affecting interim profits by being included in over- or underabsorbed overhead.

There is another argument which is perhaps even more appealing than this. It runs as follows. When fixed overhead is considered to be a period rather than a product cost, it is no longer necessary to define "normal volume," that nebulous quantity which the orthodox accountant must settle upon not only for each year but also for the whole life of the productive assets which business owns if he is to spread their initial cost equitably across the many units whose production is made possible by their existence. Here is a telling argument—from the pragmatic point of view if from no other. No one knows better than the "orthodox" accountant that his efforts to predict the probable future usefulness of capital assets requires him not only to anticipate maintenance policy but also to predict the impact of absolescence on the particular assets with which he is concerned. And he does not care to defend—as a general rule—his success in gauging these events. It must be conceded that it would be a great relief to be

able to avoid the necessity of determining normal volume. Here we have a system which eliminates it positively and finally.

However, we must not be too hasty in embracing its theory, for its practical appeal alone does not prove its philosophical integrity. Yet there is still another contention in the practical category. It is pointed out that the separation of fixed from variable expenses in the report of earnings is of real help to management, both in facilitating profit-volume analysis and in enhancing cost control.

Further, it is now possible for the advocates of direct cost accounting to add one more rather persuasive argument to their dossier. It relates to taxation and to regulation. During the summer of 1947, the United States Treasury Department made an important informal ruling, the substance of which was that operating costs incurred irrespective of the degree of plant activity do not have to be included in inventories for income tax purposes. In addition, certain financial statements prepared on the direct cost accounting theory have proven acceptable to the S.E.C.

Finally, something favorable might here be said for the conservative inventory valuations which result from the exclusion therefrom of fixed overhead charges, especially in these days of heavy capital requirements.

It is likely that there are other arguments which favor direct cost accounting theory. Yet, it does not seem necessary to extend the list further. All others stem from the main points which have already been mentioned. In these, we have the issues clearly described—from the point of view of direct cost accounting theory, at least. Let us now critically inspect the concept from the point of view of just plain ordinary, orthodox, conventional accounting.

You Produce With "Facilitating" Assets

To begin with, there are some written principles—some dogma—which the direct cost accounting theory apparently offends. Statement 3 of Bulletin No. 29 on Inventory Pricing, issued by the Committee on Accounting Procedure of the American Institute of Accountants in 1947 declares:

> "The primary basis (of inventory pricing) is cost, which has been defined generally as the price paid or consideration given to acquire assets. As applied to inventories, cost means in principle the sum of the applicable charges directly *or indirectly* incurred in bringing an article to its existing condition and location." (Italics supplied.)

While the cost accounting profession is not bound by the declarations of the Institute's Committee of Accounting Procedure, it is needless to remind ourselves that its deliberations are highly important and its judgments are both mature and authoritative. Still, it would be illogical to rest one's conclusion about the merits of direct costing on the simple fact that an authoritative body

has opined that inventory should include all (if that is the interpretation) indirect costs of manufacture. If truth in accounting is to be discovered, the search must proceed in an atmosphere of liberty. Therefore, we may properly inquire further into the practice of direct costing and the tenets of orthodox costing. The truth would seem to be that, in business practice, there are many exceptions to the principle that indirect manufacturing costs must all be included in inventory. Most cost accountants are aware of many liberties which are taken with the principle in everyday business practice. But again, customary practice must not be allowed to shape our philosophy of rightness—in accounting or in any other aspect of life—and we must probe the concept on the basis of its logic, not simply criticize it for its violation of orthodoxy.

The principle espoused by the Committee on Accounting Procedure is built on the very realistic assumption that outlays of money for capital assets are made, in the last analysis, for the purpose of creating the things which such assets will produce. That is to say, if you buy (or rent) plant, equipment, and other facilities, you do so in the belief that they will make possible the production of goods. Is it sufficient to say, then, that the existence of these assets (and the other costs which have been mentioned earlier) simply *facilitates* production? Are these not the costs of production also, and not the costs of some new category, justifying their exclusion from inventory? Is it not a violation of logic to exclude them from the costs of production by classifying them as *facilitating assets* or costs of being *able* to produce—and thus not costs of the goods produced?

It seems difficult to answer these questions from the partisan viewpoint of direct cost accounting and still remain true to the principles of logic. In spite of the admitted difficulties of matching costs and revenues, it is hard to see how the fixed costs of manufacturing facilities can be excluded from inventories if profits are to be measured as the difference between the cost of making a product and the revenue obtained for it. This puts undue strain on the word "cost".

A look at the conventional treatment of administrative and selling expenses will help our thinking here. In historical accounting there is truly one very arbitrary rule—the rule which requires that almost all the costs which succeed the point of inventory are to be considered as expenses of the period in which they are incurred and as reductions of gross revenue in computing profit. This is an arbitrary rule based mostly on the practical difficulty of assigning such costs to the products. Nobody will deny that many of the post-inventory costs are necessary to lend time and place utility to the things which, quite often, are sold in subsequent accounting periods. Yet this practical rule is widely accepted

and almost universally employed. *Now we are faced with the proposition that the arbitrariness be advanced one step further—so that inventory costs will be further reduced and period expenses that much increased. Yes, But . . .*

However, recognition of this does not exactly dispose of direct cost accounting. What of answers to the specific advantages which have been enumerated in its favor? Earlier mention was made of the advantage of escaping the necessity for defining "normal volume" and the so-called anomalous situation in conventional accounting in which reduced profits might be shown in periods of increased sales following periods of low productivity. Now it may be asked, "Is this condition a failure of conventional theory or is it the effect of some other cause?"

When this problem is studied closely, it is found that over- and underabsorptions which are attributable to volume, result in large part from the practical assumption that the life of capital assets usually must be divided into periods of years. The assignment of aliquot parts of capital cost to those years may not agree with the *use* of those assets in those years. It is important to note that *years* are chosen in the first place not because they *necessarily* indicate the extent of use, but because they *probably* do. They are the best indicators available to the accountant when he must begin to asign their cost. For, only in unusual cases, does the accountant have other data which will permit him to be more accurate at the start.

It does not appear that the failure of the estimate nor the difficulty of assigning cost should disturb the basic logical or theoretical desirability of attaching such costs to products which benefit from them. The fact that production is low in one year and high in another (let alone the differences between months!) simply means that the year is not a long enough period over which to determine the burden rate. This is a bitter pill for most practical businessmen to swallow but it is demonstrable none-the-less.

Of course, some of the other costs which fall in the "fixed" category are not fixed for such long periods as are those which result from the acquisition of long-life assets. Insurance, property taxes, protection expenses and salaries of the factory superintendent and his staff are examples. But, while they are *paid* more frequently, it is doubtful that they are any more controllable on that account. For policies with respect to insurance and protection are likely to be (and should be) long-range. Moreover, the amount which is paid in taxes is more controllable by him who assesses than it is by him who pays!

The direct cost accountant says that these latter costs, like depreciation, are also period expenses and not product costs, i.e., they should be charged to the

period and not to the product. With respect to such costs, the direct cost accounting argument may appear to be both palatable and logical. Yet neither the method of payment or the fact that these costs are "long-range policy costs" must be allowed to obscure the fact that, were it not for such costs, no goods could be produced!

Furthermore, so far as conventional accounting is concerned, errors of assignment of cost are not irremediable. If production is low and the expectations for future utilization are, as a consequence, reduced below the original expectations for operation of the productive assets, then it is clear that the time has come to take a long and critical look at the cost rates which were established on the basis of a more optimistic appraisal of their productive value.

As for the acceptance of the methods of direct cost accounting for federal income tax purposes, it may be answered that in this regard, consistency has always been held to be the cardinal virtue of business. No other words, either way will be acceptable. And wrong or right, if cost control can be enhanced, this is indeed a feather in the cap of the direct cost accountant.

Careful study of the subject does not seem to permit of any other conclusion than that there are specific things to say on both sides. The theory of cost control and responsibility accounting, as found in the literature of direct cost accounting, appears to be both sound and reliable. It makes excellent sense. It is worthy of careful study by every student of cost accounting since it appears to be an effective way to promote cost control through particular knowledge of cost behavior patterns and more general knowledge of their effect upon profits.

Fitting the Theory Into Its Place

How, then, may the dilemma be resolved? Direct cost accounting theory appears in some respects to be a very valuable tool for the cost accountant while in others it has been weighed and found wanting. The key to the question is found if one asks, "What are we seeking from accounting?" The answer must be in some such vein:

1. We are seeking an indication of the degree of success with which business is being carried on, that is, a measurement of the fruits of business endeavor —profits.
2. We are seeking the means of promoting control over business costs and expenses.
3. We are seeking ways of measuring the relative promise or advantage which lies in various possible courses of future action.

These fundamental objectives are different from one another and, as such, they require different cost approaches. It has ever been a maxim of sound accounting theory and practice that one uses "different costs for different purposes." Here is the most fundamental of cases in point.

When direct cost accounting theory is put to the test of how well it serves these fundamental objectives of accounting, the whole controversy appears to fall into a clear and logical pattern. It is in the area of *profit measurement* that the theory appears to be wanting. Little in the theory except its practical feasibility appeals to the accountant who is bent on measuring profit in the best possible way. To be sure, it offers information which is useful in break-even analysis, but such does not therefore enhance its value as an instrument of profit measurement. It is quite true that the conventional method of measuring profit is fallible, but a redefinition of profit to avoid its pitfalls seems to be more in the nature of an evasive tactic than a frontal attack upon the problem.

In the area of the second and third fundamental objectives of accounting, direct cost accounting seems to offer much in the way of clear thinking, although it is questionable that such thinking is altogether revolutionary and new. Accountants have always looked to the behavior of costs as the starting point for cost control and they have ever been alert to the necessity for studying cost behavior under certain conditions before selecting the right course of action from among several possible alternatives.

Full Knowledge of Consequences

It is clearly necessary for accountants in all stages of business activity to search continually for ways to enhance management's control over costs and expenses. It is required of them that they assist in finding the areas where opportunities for improvement lie. It is also incumbent upon them to measure profit in some manner which will bear the critical test of logical analysis. It would appear that it is always vitally essential that accountants continually be alert to the dangers of confusing the principles of profit measurement with the other two goals.

In the ranks of the direct cost accountants there are those who recognize these distinctions. One large company is reputed to have changed over to direct cost accounting in the full knowledge that income would—in its management's view—be "distorted," but with the expectation that cost control would be enhanced by the direct costing method. This, it was thought, was of sufficient moment to justify the adoption of the method because, as we said "if cost control is improved, profit will take care of itself." But there is nothing to bar the accountant from using both of these tools in his work. He may very well have his cake and eat it too.

These, then, seem to be the essential facts of direct cost accounting. Its theory has enlisted more and more disciples in the last few years. It is not unlikely that its full strength is yet to be attained.

Production Management Is Serious Business

by HENRY W. HANLEY

Production Manager, Scintilla Magneto Division, Bendix Aviation Corp., Sidney, N. Y.

Vigorously presenting production management as a focal function in successfully carrying on a manufacturing enterprise, the author of this paper lists the responsibilities involved and essays to place them with respect to the organization as a whole. The major factors underlying effective production scheduling are reviewed and commented upon.

THERE IS NO INDUSTRIAL FUNCTION which has been subject to more so-called "system", red tape and general confusion than the function usually referred to as production control, nor is there any industrial executive function more indefinite in degree of job responsibility and more varied in job type than that associated with the title of production manager. It usually means something different in every company and may cover any job from head stock-chaser to factory manager. This paper is written to consider the scope of production management responsibility and to try to "nail down" in clear language the fundamental principles and brass-tacks methods which will give practical production and billing results and make good on delivery promises to customers. The need for such a presentation is now when the shadow of the expeditor of defense production has appeared on almost every factory wall.

What Is Production Management Responsible For?

The production management organization must embrace certain specific functions and responsibilities if it is to be worthy of the term and title. The following list is offered as constituting an outline and a sound grouping of the functions and responsibilities properly and necessarily identified with an effective production management organization:

1. Participation in and approval of all delivery schedules.
2. Analysis of parts and material requirements and the scheduling and issuing of necessary purchase order requisitions and factory orders, i.e., inventory management.
3. Determination of effective dates in integrating engineering changes in design with production in hand.
4. The raw and finished stores functions.
5. The shop dispatching and production control functions.
6. Authority and responsibility for organizing and holding regular meetings with other department heads and supervisors for the purpose of solving any problem or removing any condition which impairs or delays proper production schedule conformance. Briefly, this is the responsibility for making good on schedules.
7. Maintenance of such statistics relative to direct labor input, future direct labor requirements, and schedule and billing performance as may be necessary for the constant information of (and recommendation to) top management on matters affecting over-all plant operations.

Business Is a Single Endeavor

Before entering upon consideration of procedures related to the above functions, it might be well to try and get an over-all perspective which will make it clear that we can never deal with just one aspect of a business. We must always consider the business as a whole. So, to begin with, what are we in business for? There are a number of things we are not in business for. We are not in business for the ultimate attainment of perfection in any endeavor or for strict adherence to dogma of any sort, and certainly not to run a paper work mill!

We are, of course, in business for a profit. Every person and every function in the company is part of a business enterprise in which the end purpose is to ship goods, as promised and at a profit. It is sometimes overlooked that every hour of everybody's time becomes product cost and is recovered only as goods are shipped. Profit is the only means by which a manufacturing company can survive. It is the sole purpose of all paid effort. The very vital importance of the matter of getting the end product of everybody's effort shipped and billed as scheduled is not well appreciated generally and this lack of appreciation is the cause of more mischief, more grief, and accounts for more unprofitable business operations than any other known cause.

Making good on production schedules is a vital top management concern. Top management participation should not await emergency or calamity conditions. Top management participation frequently and top management support all the time are essential to really successful operation! The primary responsibility is one of management policy—to see that there is an adequate organization, organized to the perspective that the business is an enterprise, the main purpose of which is to produce a product on time at a profit! Then the responsibility for making good on production schedules will not be left, as it usually is, too completely with the production manager and the production control group. If these men have the proper concept of their responsibilities and are conscientious in their work, it is a nerve-racking, heart-breaking job.

Encountered and often seriously mismanaged are the matters of customer and interdepartmental relationships. Every schedule should be set, every important decision reached on the basis of a profitable operation. That is what we are in business for. Nor is the company's business a place where we either grant or receive personal favors. It is not as a favor to the sales department that the production department responds to a customer's urgency. The factory foreman is not doing the production control man a favor when he sets up a job that is urgent or makes good on a factory parts schedule. Everybody is paid to be re-

sponsive and to act at all times in the company's interest and that, usually, is their own and the customer's interest as well.

You Are Dealing with Time

Now, with our perspective set, we are about ready to get down to the particular business of making good on schedules. However, we have first to relate the several phases of production management to the essential fact that time flies. There are four equally important components in making good on schedules. They are the over-all time cycles required to provide and complete the following principal functions:

1. Engineering drawings and specifications.
2. Tooling and operation sheets.
3. Material procurement.
4. Shop processing.

Sound scheduling and profitable conformance to customers' schedules requires the proper allotment of time (or a fair distribution of available time) to each of these major phases of the total cycle or lead time required for the orderly and profitable operation of the business. It is unwise to let a manufacturing plant drift from crisis to crisis without adequate time to perform the processing phase economically and to maintain proper quality controls, while time has been allowed to slip loosely through the fingers in the engineering, tooling, or material procurement phases.

It must be obvious then that, in scheduling, time is "of the essence". Sound production management—successful general management—must have as its very foundation a proper understanding and evaluation of time as a precious and, as it were, a tangible asset. Time is the third dimension of cash. Time is the stuff that costs are made of! Time is a moving and master pattern into which all things either fit or mis-fit, depending upon the individual and collective human action associated with a particular project or enterprise. Time, its efficient use in the plant, its effective use in establishing deliveries to customers, is the bulwark against competition and the basis of good will, i.e., the disposition of the customer to stay with a reliable supplier!

When does this time, which must be so wisely handled, come into being? Time starts when idle plant capacity six or nine months hence can be foreseen. Time starts at the earliest moment that the customer's needs can be determined, for the time that a competitor started cost reductions and design improvements may be further advanced than can be known. In other words, plans and decisions must be made on time or time will make them—maybe on a knock-out count!

Hence all activities must be organized on a time schedule, with the time allocated equitably and fairly and all departments held responsible for organized, orderly conformance. There will be unexpected troubles and delays but a *drive* to a finish on time is quite in order on occasion. This very frequently is not a convenient development and may not permit adherence to procedure for the moment. It very likely will not be economical, viewed in the narrow focus of an individual order or viewed as an individual element of the cost breakdown, but there are times when the end justifies the means.

Check-Points in Production Scheduling

In considering specific procedures in production management, the approach here will be to start with scheduling and to tie in the important contributing factors as we go along. The principal points to check in establishing schedules or delivery quotations are:

1. The status of engineering drawings and specifications and the existence of a definite date of complete availability.
2. Tooling required.
3. Purchased materials required.
4. Normal manufacturing lead times on the principal or limiting components and a check on capacity factors on known or anticipated "bottle-neck" spots in both manufacturing and testing.
5. The possible reallocation of materials and rearrangement of project priorities to accommodate changing conditions and important accounts.

Factory schedules are, of necessity, a compromise among many influencing factors, sometimes including a compromise with the customer. It is infinitely better to run the business at a profit, making good on schedules, than to have it run you, often at a loss, just because you say "yes" too often to too many of your customers—and end up pleasing very few of them.

Each of the major factors involved in scheduling merits separate discussions.

Production Scheduling and the Engineering Function

First is the engineering function as it directly relates to scheduling. There has to be a prompt and reliable response on the part of the engineering department in providing basic information to the production department. There should exist the same degree of "schedule-mindedness" among engineering principals as is expected from manufacturing principals. As occasions warrant, there should be a revision of project priorities and new engineering schedule dates established but always coordinated with the production and sales departments, for very obvious reasons.

It should not be assumed, once the engineering data have been released, that

there is the end of it from an engineering viewpoint. If it is a new project, problems should be expected and anticipated. Some time must be allowed for them in the schedules notwithstanding the fact that sound engineering practice provides a "manufacturing comment" stage before engineering data are released as final. Moreover, even if engineering samples or model units were duly tested, it is inadvisable to rush into production without making "test" units first.

There are going to be engineering changes just as long as a company is in business. This is one of the fundamental principles that keeps a company in business. It is the only means of product improvement. However, there are times during the development and improvement of every product when desired changes should be deferred in the interest of getting some shipments made and a product on the market. Customers usually have definite delivery needs upon which a great deal may depend and upon which important decisions are made, including their source of supply. It is frequently a sound, if not an absolutely necessary practice, to "lock up" changes for specific periods.

Above all, as a matter of standard practice all of the time, there has to be in effect a well-organized formal procedure for investigating all proposed engineering changes and for their final approval and effective dates. Tool provision, tool expense liquidation, material procurement, inventory disposition, and the effect on current schedules and field service are some very vital factors which have to be considered in connection with engineering changes. It cannot be a haphazard, catch-as-catch-can matter. It has to be well organized, and should be coordinated by a competent individual. This is usually a full time job.

Production Scheduling and the Tooling Function

Next, in order of normal sequence of the major factors in scheduling and making good on schedules, is the matter of tooling. The scheduling of tools, either purchased or those made in the plant, and the conformance to these schedules is just as important, day for day, as is the completion of manufactured parts as scheduled. It requires the same organization and follow-up usually accorded parts manufacturing. Getting the tools on time requires sound tool scheduling, carefully integrated and frequently adjusted to customers' schedules. It requires prompt and complete analysis of the tooling required before the product is scheduled. It means the provision of tool steel and perishable tools in time. It requires a knowledge of tool room capacity and as good a distribution of the future "tool load" as is consistent with shipping obligations.

Tool control is a function every bit as important as production control. It re-

quires the same organized and positive approach. It requires the same frequent review of progress against schedules. It frequently requires the same special efforts to finish on time as do production schedules. Tools provided on time, even by overtime, can very often save four-fold the overtime otherwise required in machining or final assembly operations—and it is a good deal easier on the nerves. Tools not completed on schedule usually result in improvisations and expensive manufacturing methods to meet urgent customer demands.

Production Scheduling and the Purchasing Function

The third major factor affecting sound production scheduling is the purchasing function. The production manager has a big stake in the purchasing job. He is entitled to participate in establishing purchasing policies as they relate to reliability of source, advisability of active second source, degree of expediting action to be taken, special shipping arrangements, and other factors relating to getting the goods on time.

The purchasing job is a major responsibility. It is going to be an increasingly exacting job in the future and is a matter that the production manager had better keep his eye on. Here is a good test of the degree of vigilance needed. Take a dozen special or principal purchased parts or materials and ask these questions:

1. Are you dependent on a single source for any of them?
2. How long would it take to tool and get into production at another source if the present source were a casualty of flood, fire, or prolonged strike? (If there is exposure in this connection, you had better make some plans, if not some provisions, for such emergencies.)

Many companies have been driven to the wall or lost valuable accounts through vendor failure. It pays to look over material sources with an eye to security and not to put all your eggs in one basket, if it can be helped. There are sound protective measures which can be taken in all eventualities if a little foresight and forethought is applied. Stand-by tooling, temporary tooling, match-plate patterns—just to mention a few—are protective measures which will serve as insurance against being out of business as a result of a vendor's calamity.

It should be definitely understood that "delivery as scheduled" on the purchased materials must be treated by the purchasing agent and the buyers in the same positive manner and with the same sense of responsibility as the production manager and other manufacturing principals treat manufacturing and customers' schedules. Vendors should clearly understand that their delivery schedules are to be kept as sacred as the company's customers' schedules. This rules out sloppy scheduling of purchases or poor follow-ups. If all of the purchasing

conditions are right, as they affect production schedules, a very important cornerstone in building sound production management will have been laid.

The Matter of Lead Time

Sound scheduling, including manufactured parts scheduling, purchased material scheduling, and assembly scheduling, requires a good practical knowledge of the principal time components which go to make up the total lead time required to produce the various finished products. In this connection, there should be maintained a management-approved lead time chart or master lead time schedule, to be made available to all interested personnel. This chart should not only establish the minimum total lead time for the products produced, but should also show a breakdown of the principal time components which go to make it up, stated in number of working days.

For example, the lead time schedule should start with the number of days required to process the customer's order from date of its receipt until it is released to the factory organization to analyze material requirements and to proceed with procurement and manufacturing. It should show the length of time required to procure the principal or limiting raw materials and purchased parts. Likewise, it should show the length of time required to fabricate the limiting manufactured parts in economic lots, under normal conditions.

Without enumerating the other component time factors, it should be noted that a complete lead time schedule should end up with the time required for the packaging and shipping function and should properly reflect those instances in which lead cycles run concurrently, such as is the case with purchased parts and manufactured parts or tooling and purchased parts or tooling and purchased raw material.

Practicality and Flexibility in Production Scheduling

There is a point in connection with submitting the final delivery date quotation which should be mentioned. All delivery quotations are preferably stated as so many weeks from receipt of the customer's order or, in establishing internal schedules, so many weeks from release of engineering data, or whatever the limiting factor may be. This places the responsibility for "kicking the job off" on time where it rightfully belongs. There has been more than one calendar date quoted only to find that the customer's order was "slightly delayed" in being placed or that final engineering specifications were released a "little later" than anticipated.

There is very frequently a gap between the customer's requested delivery date

and the date at which production can be scheduled. On items which are in production, quite a bit of flexibility usually exists with respect to reallocation of materials on a "borrow" basis, as well as opportunity to accelerate open purchase and factory orders.

Usually, it is the new products which give the most difficulty in meeting customers' requirements. Here is the real test of the production organization. It is one thing to meet schedules when tooling is available and manufacturing "bugs" have been worked out, but it is a quite different thing to get out the first production units without production tooling, improved methods, and the other advantages that come with a production-engineered, production-proven job.

However, getting out the first month or two of requirements of a customer's schedule on a new product by using improvised methods and "temporary" tooling is not all on the debit side by any means. There are two very important credits:

1. It is very often the only means of getting the product to the customer when he needs it—and before a competitor does.
2. It frequently discloses the necessity of major engineering or tooling changes which can be affected at a fraction of the cost and with a great deal less distress than is the case when they are discovered only after the job is production-tooled.

There is also the advantage of working out the usual bugs, as well as an opportunity for methods study and of acquiring job experience under a pre-production run basis. Of course, a very definite extra cost factor must be considered in establishing the quantity of units to be produced on a pre-production or temporary tooling basis. This quantity must be held to a minimum or the product will not be good business at all. There should be a "starting load" cost factor allowed for getting into production on any new product and, I believe, experience will teach that this starting load cost allowance can profitably include making a relatively small number of initial units by improvised methods before major tooling investments are made.

A Word on Capacity and Machine Loading

The capacity figures established for machine tools and tools of the die and mold type constitute one other item that will bear a little hard-headed scrutiny in connection with setting up production schedules. These capacity figures are usually a by-product of cost estimating data and are too frequently taken at face value by the person or personnel assigned to setting up schedules, not to mention the influence of "wishful thinking" by some management principals when capacities are tight and the customers' schedules are running higher. It is

essential to see that there is a realistic and practical allowance made for such factors as machine failure, tool trouble, tool breakdown, operator absenteeism, scrap, re-work, lack of material, and a host of other things which can and do contribute to less than 100 per cent utilization of statistical or "slide rule" capacity.

In the foregoing comment, we have come close to the subject of machine loading and we should take a look at it. Generally, the machine load features of production control systems control nothing and serve to load the indirect expense more than anything else. There is no substitute for good men, who know their business, staying close to the job and gauging the load with respect to performance against parts schedules and with a practiced eye on the work ahead file.

Avoidance of Surprise Shortages

If the schedules are established on a monthly basis and if the products fall within a 90 to 120 day lead time cycle, it will probably be a sound practice to take off a detail listing of the open material and parts shortages covering the next thirty to sixty days' shipping obligations. This may result in duplication of information available on open purchase orders and shop orders, but it spotlights and organizes it for definite attention and action. If this undertaking seems inconvenient in consideration of the pressing need to keep abreast in planning and processing the new orders, it may be commented that it is not nearly as inconvenient as last minute surprise shortages. Such advance listing of shortages should be as specific and informative as possible, identified with specific unit schedules and showing applicable purchase orders and shop orders, material specifications and any other information necessary to make it a fully informative working document for all interested parties.

In plants in which assembly operations are of an intermittent or job shop nature, it is usually a sound practice to make a physical layout or disbursement of the required parts about two weeks prior to the month in which the units are to be assembled and to set up and keep current a shortage file reflecting what are, at this point, critical shortages. The layout feature does, of course, take up floor space. It may even require an extra stock room attendant and some extra record keeping, but it provides some very definite advantages. It removes the exposure of unexpected disbursements from finished stores of parts requisitioned by the service department or from other sources. It may still be necessary to give these unexpected demands preference, but the surprise element is

removed. The critical shortage file, maintained on the layout of the current and near-by assembly schedules, also serves as a means for the production control section to establish shortage analysis reports, distributed a day or two in advance of regularly scheduled production meetings and providing the subject matter with which the meetings are concerned.

The Important Place of Production Meetings

The heart of effective production control is in regularly scheduled and properly organized production meetings. The best possible paperwork from the office plus the best intentions in the world on the part of the shop, will not, by themselves, overcome the many difficulties and delays and make good on schedules. This takes competent, personal coordination of the different departmental functions such as engineering, tooling, purchasing, inspection, etc. It takes also good organization and follow-up, with an eye on the status of work-in-process, materials due from vendors, incomplete tooling or any other limiting factor.

The production meetings should be held by the production control supervisor, with all necessary production clerks or production expeditors present. Manufacturing supervision should be present so that personnel in this classification may be on hand and be presented with the limiting factors identified with current schedules. Decisions can be then made and necessary action taken. The difference between a stock-chasers' meeting and a meeting held with manufacturing supervision in attendance is the difference between talking about shortages and acting upon them. The responsibility for making parts and assembling units in accordance with schedules is a basic responsibility of manufacturing supervision. Schedules are not an abstract thing for some poor stock-chaser to worry about. They are the most important single item that the company is concerned with.

There can be no more important meeting held, as a matter of regular business, than the regularly scheduled production meeting. If making good on schedules and getting the billing out is considered important business, it means getting behind the production meetings as outlined. To do so may require dissipating the reluctance of some departmental supervisors who feel "too busy" to participate in production meetings. It must mean the acceptance of personal responsibility on the part of manufacturing supervision for getting things done on time.

Meetings must be limited to consideration of only the critical shortages and the appraisal of other limiting factors, so that action can be taken promptly with the minimum number of people tied up. A production meeting should primarily

and remorselessly be devoted to the theme of "how many and when?" The answers should be ready and specific—and without a lot of job history.

The Production Manager and the Production Team

What are some of the necessary specifications for the men responsible for production schedules and production management? They should be positive thinkers. They should have a strong penchant for team work, the determination to work together and resolve differences of any nature without penalty to the job, the customer, or the company. It takes men in supervisory jobs big enough to rap heads together, if necessary, to remove sectional or individual animosities or points of friction and to set the example of harmonious teamwork, the only atmosphere in which the company can grow. Good team effort includes the disposition to stay with a job or problem over and beyond any strict definement of job or jurisdictional responsibility. Production men should not only be *able* to work under pressure—they should like to.

The production manager should have the faculty to sense and recognize apparent or impending emergencies and to react and impart his awareness to the production organization in the degree commensurate with the particular situation. If he cannot, he will find his chief, the customer, or the competitor making him aware of the emergency under much less favorable conditions.

The capable production manager will be alert to the reach of his task. To summarize the brass-tacks fundamentals of good production management for plant-wide application, here is what it takes:

1. A hard-headed management policy on the matter of schedules conformance, i.e., the use of time by all departments.
2. Good men and good methods.
3. Teamwork.
4. The habit of taking a positive approach.
5. A purchasing agent, factory superintendent, and production manager whose schedules are their bible, with the awareness that in their hands, to a very large extent, rests the success or failure of the business.

In line with these fundamentals, a good production manager may be said to be one who can organize and coordinate many diverse efforts in a spirit of teamwork, a man who will consistently give positive leadership and constructive help to all parties in "licking" the problems and making good on schedules, a man who will give his associates every chance and every help in doing their jobs right. It is his job to set the tone and tempo of "schedule mindedness" throughout the organization. In this he must have the whole-hearted active cooperation of the purchasing agent and the factory superintendent, in particular, and the solid support of top management all along the line.

The Complex Problem of Idle Machine Time

by CHARLES D. ELDRIDGE

Professional Engineer, Louisville, Ky.

Machines which are not running are not producing. In these days which feature unprecedented demand for production, process delays are the concern of all groups in management. This article, concrete in its illustration of the frequent difficulties of locating causes for down time, outlines a procedure under which a staff engineering activity supplements analyses available from accounting data on operations.

IN MANY PLANTS the satisfactory reduction of idle machine time presents a difficult problem. Ordinarily the accountant has fulfilled his responsibility when idle machine hours and the equivalent dollar loss has been reported to management, for there is no question but that responsibility for the reduction of idle machine time rests upon the shoulders of operating management. In spite of reports furnished by the accountant, there may not be the full and complete sort of action he is inclined to expect.

However, it would be a more intelligent reaction on the accountants' part, in such instances, to study to improve the presentation embodied in the idle machine time report than to assume a critical attitude toward management. By and large, management will act when it gets the facts in a way in which they may be put into immediate use. Often management receives reports which are intermediate in nature and require further analysis if they are to be of value. Such reports are naturally passed over for matters apparently more pressing. It is to the study of idle machine time and to adequate reporting of it that this article is addressed.

Reports Should Establish Both Cause and Responsibility

The usual classification of causes in an idle machine time report to management is limited to headings similar to the following:

1. Set-up time
2. Lack of material
3. Lack of manpower
4. Lack of work scheduled
5. Lack of proper tools
6. Machine breakdown

Listing of lost productive hours by these causes is of considerable value to management. However, such a report falls short of facilitating specific managerial directives. It defies any but general conclusions. It is like the balance in a control account in that further and more detailed analysis of subsidiary ac-

counts or supporting facts and data, is necessary for the accomplishment of a specific objective. Here, as elsewhere, accountability must be in terms of responsibility placed on those who exercise operating authority.

Down-Time from Indirect Causes Presents the Problem

Idle machine time may be clasified into two broad types: direct and indirect. In the direct type of idle time, the cause for idleness is obvious and the responsibility may be immediately placed. The indirect type of idle time is of an entirely different nature in that its cause is most difficult of accurate determination. It is with the indirect type of lost time that the most trouble is encountered. There are frequently many apparent clues as to the cause and hasty conclusions will not only prove to be wrong but will lead to misunderstandings between management and immediate supervision. While question remains as to the true cause of lost time items, the accountant may well realize that management is not going to act. There must first be satisfactory proof of the presumed cause, and it must rise to the surface through reporting media.

A Case in "Lack of Materials"

Let us take an example of how well-obscured a small delay (but there could be many of them) can become. Suppose a gang drill, drilling holes along the edges of a flat cover plate, is down for some reason. The operator says he ran out of stock and that he is on a standing order, "lack of materials". The foreman is trying to get some more stock or else line up the next order for the machine. (Of course, if the gang drill goes to another order there will be further delay for a setup.)

The foreman finds that the order had called for 250 pieces but that, about half way through, the operator just ran out of stock and the material handling department could not locate any more. The foreman called the production control department and learned, about a half-hour later, that the inventory control department had made an error in perpetual inventory records. The stock was, in fact, exhausted. The foreman hands the new order to the operator and setup for it begins—and must be accomplished before the gang drill is off its "lack of materials" status. The story could have been even more confusing if the perpetual inventory records had been correctly posted from an erroneous production count when the blanks for the cover plates had been cut out.

The point to dwell on is the inadequate nature of the information picked up on the records relative to this incident. The standing order recorded only "lack

of materials". In a day or so this actual basis of the time charged will be forgotten in the run-of-the-mill business. How is the departmental foreman going to get the inventory control department to make periodic checks of the physical count to adjust its records? How will management know that this condition existed or be able to assign responsibility even if as much detail as the following was provided: 10/6/51 Dept. A. Gang Drill #5 1 Hr. "Lack of Material". The weekly or monthly summary might show far less detail, probably a total for Department A on all machines under the cause of "lack of material".

The Case of the Faulty Forgings

Another example might be a turret lathe which is down. The operator is standing by while two machinics are apparently working on the setup. However, it develops that one-half hour is the standard allowance for the setup and that is all the time it usually takes. This time, though, two hours have passed by, with only short intermittent runs. The setup mechanic had never put this job on before and an hour slipped by before the foreman had noticed and had sent for the setup boss. As the setup boss had been in a safety meeting, he was a half-hour in arriving, but he is here now.

The setup mechanic is regarded as a good man but the forgings being machined are not fully filled out and, unless there is a very accurate setup, a high rate of scrap results. The operator is of the opinion that, if the forgings had been all right, the original setup would have done the job. The operator is asked if the type of forgings he has received has been discussed between the foreman, the inspectors, and forge shop supervision. His reply is that the subject had been gone over several times before. Forge supervision is reported as claiming that the forgings are the best they can make with the dies available. Tool and die supervision, on the other hand, is reported as saying the forging had been done with the steel at too high a temperature and that the dies were made according to print. It is the inspector's viewpoint that, with careful machine work, the forgings should come out fairly well anyway.

The story could go on and on. The lost time will probably show as excessive time for setup. It could well be that many extra hours will be lost in this department from over-standard setups before anyone actually finds the underlying factors at fault.

The Foreman Must Stop Somewhere

Foremen generally know the nature of the problems encountered in their work but, as to idle machine time, it is usually a present fact when they encounter it.

As production foremen, they must immediately concentrate on planning around the idle machine to keep production flowing. It is not often that a foreman will be able to become closely associated with the various contributing causes of lost machine time. He will know that equipment was down and have a rough reason for the lost time—and that is as far as he can go with the problem most of the time. The foreman is a production man and not a staff investigator. The point at which the foreman stops his investigation represents the starting point in study for lost time elimination.

The foregoing reasoning is not intended to remove a responsibility from the foreman's shoulders that all organizational teaching dictates should rest there. Rather it is intended to stress the fact, which many investigations of lost machine time indicate, that other departments contribute some of the underlying factors which ultimately develop into lost machine time at a particular location. As we progress futher, the implications of this observation will become clearer. It may be wondered if it will be suggested that management should be bothered by small matters which occur daily. The answer is "No". The manager should not be troubled with such details, but it will be suggested that a buffer staff position be established to ascertain and digest these details, so that the generalities will be presented to management with appropriate suggestions.

A Variety Show of Idle Machine Time Origins

In other words, the complete picture of idle machine time may extend beyond the immediate departmental supervision and the plant engineer as well. Various nonproductive departments may play an important part in contributing to idle machine time. A brief list of selected possibilities will illustrate the point more fully:

1. A department may run certain parts for several hours or for a few days, without defects being noticed until the parts are put in process in the next department. There may have been intermediate storage for some time. Perhaps there were several similar parts and the chief inspector gave out specifications that were slightly but sufficiently different to cause the trouble. It may be that a recent change had come through from the engineering department and had not been entered in the inspection department files.
2. The engineering department may have overlooked some small essentials in tooling for a new job or may not have followed through in the purchase of periodic replacements soon enough. In this case, it is possible that the delaying items will not show up until the job is set up and ready to begin or is started and is forced to stop.
3. The tool and die department may not have given the proper heat treatment to parts to be used in some future setup. The facts will not necessarily come to light until the parts actually fail in production, perhaps repeatedly, and after several

replacements show much shorter tool life than anticipated or than was obtained in previous experience. Even then, without adequate follow-up, the true cause of such delay may never be known. The probabilities are that the production foreman would simply be cautioned to properly supervise his men and to instruct them more carefully to avoid the excess breakage of expensive tools.

4. The mechanical department may not make adequate inspections of plant equipment. There may be frequent emergency repairs which, from all appearances, are unavoidable until plain common sense dictates that it all just could not happen under the proper maintenance procedure. Even so, such a situation may exist for months if not bad enough to attract the special attention of management and the engineering staff. Repeated emergency repairs and preventive maintenance do not live together. Machines must be regularly examined to determine faulty operation in time for proper repairs to be scheduled when the equipment is not in production.
5. Some department involved in an earlier productive process may have gradually wandered away from the true interdepartmental standard of quality, due to excessive tool wear. This will cause periods of idle machine time in later departments.

These and similar hidden enemies of production are always lurking in our plants and seem to defy detection until they have already taken their toll. It may now be realized that although, organizationally thinking, the foreman is responsible for lost time in his own department, he cannot possibly have sufficient knowledge of overall operations to anticipate all possible causes of idle machine time before they actually hapen. A production department in a plant is far from an independent enterprise. It is dependent upon other processing departments as well as upon service departments. The foreman must assume that all other departments will perform their jobs just as he is expected to do his own.

A Way Out — The "Lost Time" Engineer

To the present we have considered the usual form of the idle time control reports and some of their shortcomings, the complex nature of idle machine time as it ordinarily occurs in the plant, and some types of lost productive time which may never come to the attention of either the accountant or management. If the picture is a little upsetting and the thought inspired in the reader that all may not be as well as supposed in his own plant, the purpose of this article has been achieved. It is only when we question our own efficiency that we actually begin to progress.

There is a simple and successful method of ferreting out the true causes of lost or idle machine time and this will now be described. As previously mentioned, the supervisors and process engineers have their own jobs to perform and seldom have the time or the patience to run down the various contributing

causes which finally shut a machine down. As a matter of fact, there are generally pressing problems on the minds of these men as they hurriedly move from place to place in the plant and they cannot digress for such investigations. Thus, there is a gap between the departmental supervisor and management, a gap which leaves the foreman trying to do his best to reduce lost machine time and management without the time to study the problems enough to help the foreman. Into this gap may be placed an engineer who is familiar with many of the plant operations and whose personality is agreeable to most of the plant foremen. Such an engineer, freed from all other details, should spend his day in the plant observing operations and tracing down all possible leads that develop as to the causes of idle machine time.

The engineer selected for this work may feel completely out of his sphere at first. At this point, the accountant may be very helpful in the orientation process by showing the engineer what the overall picture of lost machine time means to the plant in dollars and cents per month. Then it should be explained that, although special emphasis has been placed upon the problems heretofore, there has been insufficient accomplishment. The accountant may go further and point out the department in which it may be possible to make the greatest savings. He may list other departments in descending order of importance as to dollar loss.

If the accountant knows that there is no preventive maintenance program in the plant, he might well drop a hint to the engineer at this time that such a program might be desirable. He might add that it is to be realized that, in starting a preventive maintenance program, extra manhours would be required in the mechanical department and that some work would lag because the better men would have to be used as machine inspectors if the greatest benefits were to be achieved. He can point out, however, that the returns from the program would soon allow the mechanical department to operate with fewer total manhours than before, because its work could be scheduled for the most part and would not be interrupted by one emergency breakdown after another. Then, too, the repair work would be done when the equipment was not on productive schedule and hence would result in considerable operating savings.

After the engineer selected has studied idle machine time for a few days in a given department, he will begin to detect many underlying factors basic in lost time prevention. He must simply live "lost time" to obtain the best results and must be present observing in the department as lost time occurs. Each lead must be followed until an honest decision may be made as to its relative importance. He should realize that "the greatest enemy to creative thought is the

preconceived idea". He will be given many-well-intentioned suggestions from supervisory personnel that will lead him into blind alleys but, if he has perseverance and good judgment, he will be successful.

Relations With Departmental Supervision

There may be a preliminary hostile reaction by departmental supervision to such an attack on lost time. That may be expected. However, if the engineer in charge of it has been properly selected, he will be able to cope with this condition. Soon the foremen will receive help unexpectedly and realize where it came from. The reputation of this engineer will grow among the supervisors. In many cases, they will want him to come into their departments. They will find in him the ear they have long sought to voice the many ideas they have cherished but have not been successful in selling to management. There may develop a closer bond between the departmental supervisor and the engineering department. Furthermore, management may learn to lean on this engineer—again if he has the coordinating, detecting, and analytical qualities needed—to trouble-shoot the reasons why jobs lag behind in the plant.

Report of Findings; Cooperation with the Cost Accountant

Among other possibilities, the "idle time" engineer may be placed on the staff of the plant management and may report directly to the plant or works manager, with an indirect relationship with the accounting department. The actual report of findings may be by irregularly scheduled letters to the managers with copies to accounting and the departmental supervisors affected. Naturally, the tone of the reports should be helpful to the supervisors and sympathetic with their problems, as good relations must be preserved for the program to be successful.

If a plant is experiencing a stubborn idle machine time problem the suggestion is repeated that a seasoned engineer be placed in the plant with the sole assignment of determining the underlying factors involved and planning for their correction or elimination. The chances are that he will be sincerely appreciated by supervision. The foremen will gradually bring many of their problems to him and he will pass them on with helpful suggestions. It is not at all beyond supposition that his work will also prove to dove-tail with that of the accountant in whose province summarization of results for cost control purposes will fall. The otherwise bare variance categories, referred to at the start of this paper, will yield to more detailed analysis.

Stores Accounting in the Veterans Administration

by BEN C. WHITE*

Systems Accountant, Accounting Systems Division, United States General Accounting Office, Washington, D. C.

Step-by-step description is given in this article of the up-to-date procedures through which stores are received, transferred and issued (and controlled through these processes) in the nation-wide operations of the Veterans Administration. The usefulness of stock status and transaction reports is accorded emphasis. Principal forms employed are included as exhibits.

UNDER THE JOINT PROGRAM for Accounting Improvement in the Federal Government, initiated in 1948, the various agencies were encouraged to institute accounting improvements in cooperation with the General Accounting Office, the Treasury Department, and the Bureau of the Budget. The system of warehouse stores accounting here described is, in our opinion, an excellent example of the accounting improvements being introduced as a result of this re-awakened interest in Federal accounting.

The tub file system of stores accounting here described has been installed in the supply depots of the Veterans Administration. This large Government agency operates three supply warehouses—located in New Jersey, Illinois, and California—servicing economically and efficiently more than three hundred consuming stations. Stocks carried encompass those found in large drug, grocery, and hospital supply warehouses. In addition, a stock of hospital equipment and of replacement parts, is maintained. Contracts for purchases to be delivered to the three depots are placed by the central office in Washington although some local purchases are authorized.

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*This paper, resting squarely on a procedure installed in the Veterans Administration, has, in a sense, many authors. It would be impossible here to recognize individually the officers and employees of the Veterans Administration whose constructive efforts contributed to the success of the installation of the tub file system of stores accounting now in operation in that agency. However, special mention is made of the following without whose active cooperation and encouragement this improvement would not have been possible: F. H. Dryden, Assistant Administrator for Construction, Supply, and Real Estate and F. W. Kelsey, Assistant Administrator for Finance, both of the Veterans Administration; Walter F. Frese, Chief, Accounting Systems Division, General Accounting Office, and R. T. Russell, R. C. Kidd, Joe B. Parks, Earl W. Bauman, E. G. Huddleston and D. A. Roache of the Veterans Administration.

Tub-File — A Panoramic Representation of Stock on Hand

The principle upon which the tub file system is based is simple and easily understood. When a shipment of materials is received at the depot, one or more cards, called Credit Voucher Cards (Exhibit 1), are punched for each stock item received in the shipment. These cards are placed in open files or tubs. When a requisition is received from a station, cards totaling the quantity ordered are withdrawn from the tub files, summarized, listed on a Shipping Document (Exhibit 2), and the shipping document is sent to the warehouse to be filled and shipped.

Hence the tub files are, in effect, a miniature warehouse in which punched cards represent the merchandise actually in stock. In appearance these files are shallow open trays, each covering an area approximately equal to that of a large office desk. They are placed on legs, waist-high, to permit easy access to all parts of the tray from a standing position. The punched cards are placed on end in the files and are separated by dividers bearing tabs containing the stock number, status, editing symbol and other controlling information, such as "Issue While in Stock," "Narcotics Item," etc.

Efficient Stock Handling and Fingertip Quantity Control

A successful tub file system of stores accounting provides management with a number of effective administrative tools, the more important of which are the following:

1. It is a simple and effective means of bringing together and holding until needed, essential information of a continuing nature relative to each stock item so that a requisition (order) can be edited promptly before the shipping document is prepared. Instructions of a continuing nature are placed on the tab of the divider cards for each stock number so that orders for stock in short supply can be filled with approved substitutes. Restricted items such as narcotics, alcohols and harmful drugs can be screened. Orders for items being discontinued can be limited to available stock. These are illustrative considerations involved in stock issuance.
2. It controls the movement of stock by providing warehouse personnel with information which will permit them to select and ship the oldest stock. The date of pack, where pertinent, is punched into the credit voucher cards when stock is received. The cards are placed in the tub files in chronological order, with the oldest receipt or pack in front. Thus, by withdrawing the oldest cards and listing the warehouse location of the stock and the date of pack on the shipping document, the storekeeper is directed to the stock to be shipped.
3. It provides a workable system for transcribing on the shipping document all pertinent information necessary to process the order through the billing, picking, packing, and shipping stages, thus eliminating the needs for secondary records and subsequent research. This is accomplished by punching into the credit voucher cards, when the stock is received and the information easily obtainable, the unit of issue, type of package, unit cost, total cost of package, number of units in package,

CREDIT VOUCHER CARD

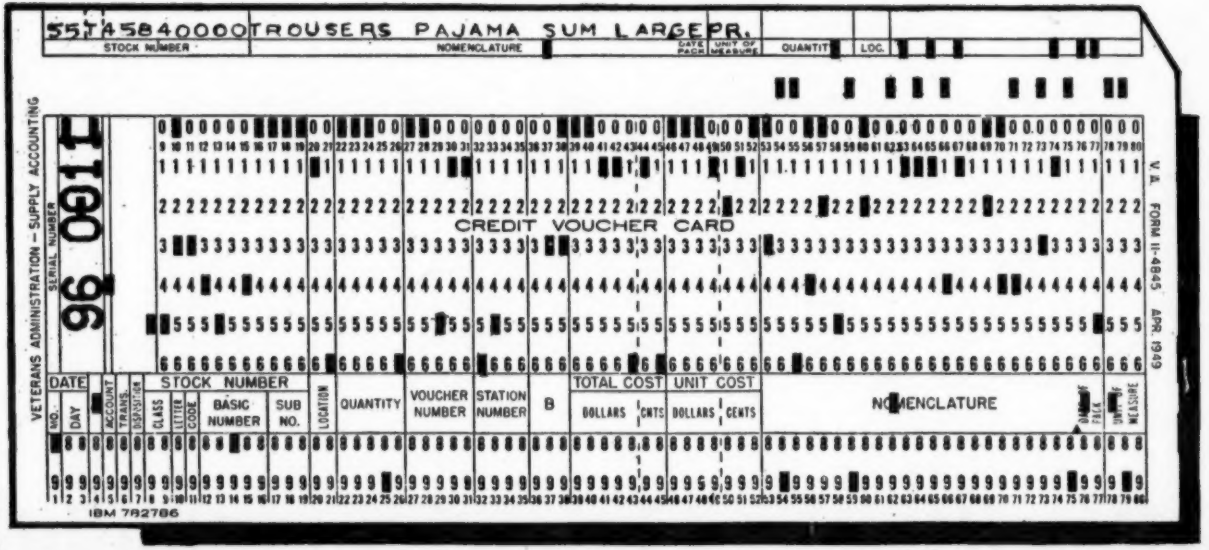


EXHIBIT 1

warehouse location, freight classification code, accounting code, and the gross weight of each package. With this information stored in the cards several important operational economies are effected:

(a) The shipping document can be written and priced mechanically with speed and accuracy, and with substantial savings in clerical costs.

(b) The stock can be picked without reference to a separate stock locator file.

(c) The items to be selected from each warehouse area are listed on separate sheets. The various sheets are distributed among the area storekeepers concerned and the stock is picked in all areas at the same time, thus substantially reducing assembly time and saving valuable loading space.

(d) Repacking is held to a minimum by using the original package information printed in the shipping document, thus reducing, so far as practical, the amount of loose issue stock requiring repacking.

(e) Constant reference to the consolidated freight classification manual is avoided since the type and weight of the various containers and the freight classification code are printed on the shipping document. Thus the transportation section can preplan for and therefore provide the most economical transportation facilities. Also it can prepare the required bills of lading while stocks are still being selected in the warehouse.

The following table shows the improvement in service directly traceable to the installation of the tub file system as the basis of the Veterans Administration stores procedures:

EXHIBIT 1

Elapsed time between receipt of requisition and shipment of stock.

	Prior to installation (Sept. 1949)	After installation (July-Dec. 1950)
Average elapsed time—all requisitions	8.6 days	6 days
Shipped 1-5 days after receipt	14.0%	47.2%
Shipped 6-10 days after receipt	58.6%	43.5%
Shipped over 10 days after receipt	27.4%	9.3%
	100.0%	100.0%

The advantages of the tub file system have been classified by major categories in the following summary:

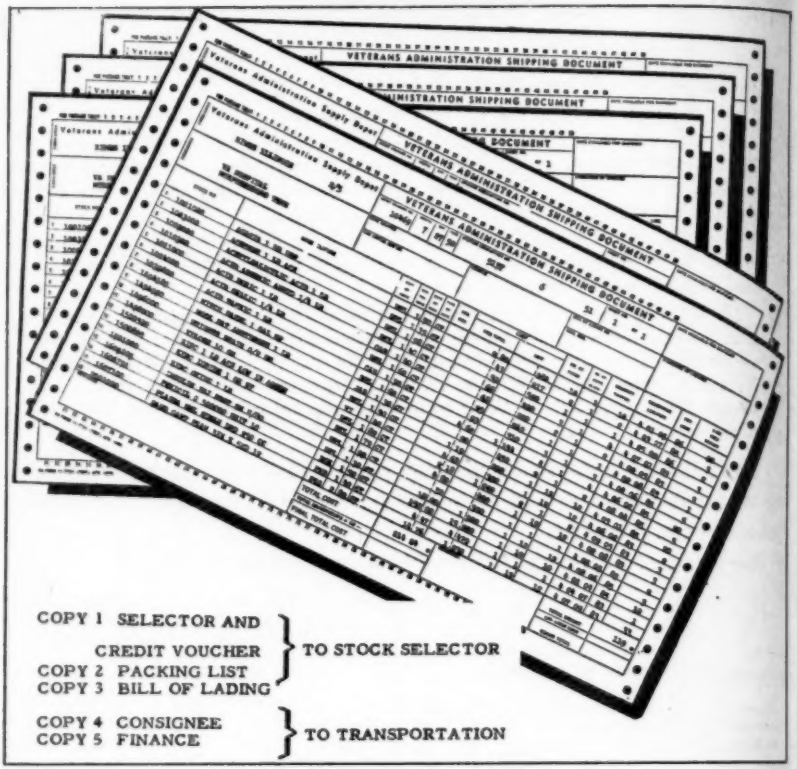
Reduces the cost of depot operations—
- Reduces materials handling.
- Reduces warehouse refusals and inventory adjustments.
- Eliminates separate locator record.
- Provides for an even distribution of work load.

Provides inventory control at all times—
- Increases control over stock on hand.
- Provides absolute fiscal control over inventories.
- Signals low stock point automatically.

Rapid service—
- Combines editing and stock availability check.
- Provides for automatic substitutions.
- Insures issue of oldest stock first.
- Provides automatic pre-billing.

Pre-planning of transportation requirements—
- Provides semi-automatic preparation of bills of lading simultaneously with stock selection.
- Provides gross weight data for pre-ordering of transportation.
- Provides data for determination of most economical means of transportation.

SHIPPING DOCUMENT



From a Single Pre-Punched Record

Stock Number	Warehouse Location
Nomenclature	Storekeeper
Unit of Measure	Freight Commodity Classification
Type of Package	Unit Cost
Date of Pack	Total Cost
Number of Units in Package	Fiscal Account
Weight of Package	Stock Condition

Type Transaction

EXHIBIT 2

Equally important, but much more difficult to measure, are the intangible advantages which flow from placing complete and readily accessible information at the fingertips of management. The flow of materials into and out of depot stock is mirrored in this "miniature warehouse" in the stock control

division. Accurate and instantly available information centralizes control at all times and reduces losses from over-stocking, spoilage, pilferage, and uneconomical use of space.

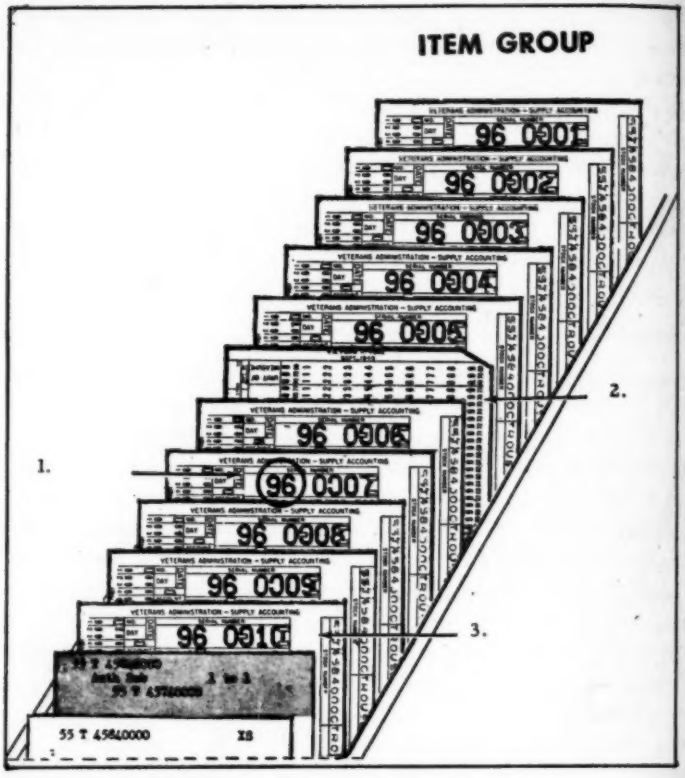
The plan of the present article from this point on is to describe the procedure through which the credit voucher card and shipping document are created and to detail the remaining procedural steps and principal forms through which physical and accounting control of stores is maintained. In doing this, first attention will be given to physical control—the aspect in which stores system are often either weak or out of step with the general records—and then to proceed to its integration with accounting and value control.

Document Control and Tub File Operation

When a requisition for supplies is received from a station serviced by the depot it is routed immediately to the editing desk where a depot voucher number is assigned and the requisition is recorded in the requisition control and credit voucher register. This register shows the date the requisition was received in the stock control division and the date the order was shipped. A correspondence file jacket is also made at this point into which the requisition will be filed after action on it has been completed. In the meantime, the empty file jackets are visual evidence of the number and currency of the requisitions being processed.

The requisition then goes to the tub file analyst who withdraws punched cards from the tub files in stock number sequence, equal to the stock quantities requested. The credit voucher card and the divider tabs in the tubs provide pertinent information by means of which the tub clerk can edit the order as it is being prepared. For example, if the unit of issue is in lots of 100 and the requisition is so large that it is probable that the requisitioning station intended to order in units of 1, the order would be questioned immediately. Likewise the divider tab indicates the stock numbers of all items which may be substituted for the item ordered, permitting fuller utilization of stocks on hand. Exhibit 3 portrays an Item Group section of a tub file and makes clear the sort of information at hand.

The credit voucher cards are designed to reflect the number of units in the original package. This is important in that it avoids repacking if shipment can be made without breaking the original package. Assume that a shipment of drugs has been received packed 24 units to the carton. If an order for 25 units of this item is received, the tub clerk would pull a card for a 24 unit carton and amend the requisition accordingly. The tub clerk has authority to increase or decrease orders within reasonable limits.



1—UNITS IN A PACK—Indicates number of units in each pack.
2—REPLENISHMENT CARD—Created from new receipts with total quantity held in a single card until breakdown is desired.
3—NEXT CARD TO PULL—High number represents number of packs of item located in the warehouse.

EXHIBIT 3

Another device is used to reduce the number of cards in the tubs. This consists of the use of a Master Replenisher Card (Top of Exhibit 4) in the tub to consolidate on a single card a large number of units of a stores item until a breakdown by units is desired (see Exhibit 3). Suppose that 1,000 cases of canned fruit are received. Only enough credit voucher cards would be prepared to take care of normal issuance needs and the balance of the stock received would be held in a single card until a further breakdown is required. Thus 50 credit voucher cards representing 50 cases might be prepared and the

remaining 950 cases held on a single replenisher card. As the 50 credit voucher cards are withdrawn in processing requisitions, an additional 50 credit voucher cards are created by a very simple reproducing operation, and the replenisher card correspondingly reduced.

If there are insufficient credit voucher cards to fill the requisition, the replenisher card is withdrawn from the tub and sent to the machine room where additional credit voucher cards are reproduced. In the meantime the clerk places a marker in the deck of cards he is selecting, which protrudes from the tray and warns the accounting machine operators that certain cards are missing. When the credit voucher cards have been created, the marker is replaced by the required number of credit voucher cards and the tray representing the quantities requisitioned is sent to the machine room for tabulation of the shipping document.

Preparation of Shipping Document

When the tray of credit voucher cards withdrawn from the tub files by the tub clerks, together with the requisition, is received in the machine room, the requisitioning station header cards containing name and address, are withdrawn from the files to be used for heading up the shipping documents. The only card punched is one showing the date and the depot voucher number assigned so that complete identification will appear on the shipping document. The cards are next sorted by warehouse (storekeeper) area. They are then placed in an alphabetical accounting machine equipped with a summary punch attachment, for preparation of the shipping document.

Where more than one card has been pulled for the same stock item, e.g., 20 cards representing 20 units of say stock number 1001000, the 20 cards will be added in the quantity and price positions and a single line printed on the shipping document for the item. At the same time, a Stock Detail Card (Exhibit 4) will be automatically summary punched for all the data printed on the single line of the shipping document. These summary cards are used for all accounting and control. The 20 cards will thus appear as one line on the shipping document and one card in the control records. The price of the various line items is accumulated in the machine and, when the listing is completed, the total is printed on the last page of the shipping document and summary punched on a price summary card for the control records.

The price summary cards on which the totals of the shipping documents have been punched are sent to the editing desk as evidence that the shipping docu-

MASTER REPLENISHER CARD
56FD4510000FLOUR WHEAT SOFT 100 LB SK 001 4 1800 11 01 01
STOCK NUMBER
DATE
NUMBER OF UNITS
COST PER PACK
UNIT COST
DOLLARS
CTS
NOMENCLATURE
UNIT OF MEASURE
PLY ACCOUNTING
DATE OF PACK
ACCOUNT
TYPE
CLASS
ITEM CODE
BASIC NUMBER
SUB NO.
LOCATION
STOCK DETAIL CARD
56SD4300020162001240 0
STOCK NUMBER
NOMENCLATURE
005808 5131 146620
QUANTITY
STATION OR REGN NO.
VOUCHER
BASIC NUMBER
SUB NO.
SHIP. CLASS
UNIT COST
DOLLARS
CENTS
NOMENCLATURE
UNIT OF MEASURE
ACCOUNTING
DATE
MO
DAY
YEAR
ACCOUNT
TRANS TY
DISP IN
CLASS
ITEM CODE
BASIC NUMBER
SUB NO.

EXHIBIT 4

ment has been prepared and forwarded to the warehouse. The shipping document goes to the warehouse office where loading dock space is assigned for assembly of the shipment and the various storekeepers concerned are given that portion of the shipping document which is to be filled from stores in their custody. A copy of the shipping document also goes to the transportation section where the bill of lading is prepared and arrangements made for transportation.

When the office copies of the shipping document are returned from the warehouse, the date the order was shipped is entered on the requisition control and credit voucher register and the requisition is filed in the correspondence jacket previously prepared.

Purchasing Procedure and Due-In Control

Purchase orders placed by the central office are prepared on a stencil form from which can be duplicated as many copies as may be needed to serve notice to all interested parties and to effect shipment of stocks. Each depot indicated as having property due-in, is furnished copies of all purchase orders at the time the order is placed with the manufacturer. These master copy purchase orders indicate all quantities of each item due each date to each depot. They are accompanied by Due-In Control Cards (Exhibit 5), one card for each item for each delivery date.

Accompanying each master copy purchase order are copies of an invoice and receipt for property purchased. These receipt forms are duplicated from the same stencil and contain information identical with that on the purchase order, except that the quantity and amount columns are left blank. The form is prepared in order that the depots may receipt for stocks with a minimum of effort. One receipt form for each scheduled delivery on each purchase order is forwarded to the operations division as notice of stocks to be received, inspected and warehoused. The purchase orders and their corresponding receipt forms are filed by purchase order number in separate file folders. Due-in control cards are filed in stock number and due date sequence, thus giving a complete cross index of all deliveries due.

Due-in control cards are a mechanical means of accumulating budgetary and stock management information. They are not used in the creation of general ledger "proprietary" records. The latter records are created from the Tally-In Reports (Exhibit 6) recording actual quantities received. Thus the use-span of the due-in control card coincides with the budgetary (contingent)

VETERANS ADMINISTRATION - SUPPLY ACCOUNTING
V.A. FORM 11-4826
MAY 1968
27-S-07090000
STOCK NUMBER
0017700
QUANTITY
UNIT OF ISSUE
2-07-1
DUE DATE
06478
REQUISITION NO.
10014
PURCHASE ORDER NO.
H
ACCOUNT CODE
NOMENCLATURE
DUE IN CONTROL CARD
PROTECT THIS CARD
INSTRUCTIONS
1. ENTER HERE THE QUANTITY STILL DUE IN
2. ENTER ZERO IF ENTIRE QUANTITY IS TO BE CANCELLED
3. FORWARD WITH AFFECTING DOCUMENTS TO SUPPLY ACCOUNTING
QUANTITY REMAINING DUE IN
THIS CARD IS YOUR ONLY MEANS OF CANCELLING DUE IN QUANTITIES FROM STOCK RECORDS AND MUST BE HANDLED WITH CARE AS IT WILL BE PROCESSED THROUGH ACCOUNTING MACHINES
DATE
MO.
DAY
YEAR
ACCOUNT
TRANSACTION
DISPOSITION
STOCK NUMBER
CLASS
LETTER
CODE
BASIC
SUB.
QUANTITY
REQUISITION NUMBER
PURCHASE ORDER NUMBER
UNIT COST
DOLLARS
CENTS
NOMENCLATURE
UNIT OF MEASURE
IBM 772413

EXHIBIT 5

liability being created when the purchase order is issued and cancelled when the merchandise is received and the contingent liability ends. The due-in control procedure is as follows:

1. Due-in control cards are created from the purchase order. A card is punched for each line entry. The date to be punched is the due date. The cards are interpreted and forwarded to the depot incoming property section with the applicable due-in documents.
2. Cancellation of due-in postings is effected by punching a cancellation "X" (11 punch) in those due-in control cards which reflect a quantity of zero remaining as due-in. If the quantity indicated on the face of the card as remaining due-in is other than zero, a new card will be created. Both cards are forwarded to the central office. An extra copy of the new card is used to reestablish due-in control over the balance of the shipment not yet received.

The due-in card file is maintained to provide a record by stock number of the items due in the depot. It also provides a simple method of determining delinquent deliveries. These cards contain the following printed information:

1. Stock number.
2. Nomenclature (Optional).
3. Unit of measure.
4. Requisition or purchase order number.
5. Date delivery is due.
6. Quantity of stock due.
7. Transaction code.
8. Account.

This file is maintained in stock number order by due date and is used:

1. As a cross reference to the document files.
2. As a detailed record of due-ins on each item.
3. To effect due-in postings to stock records
4. To cancel out due-in postings on stock records.

Receipt of Stock

Incoming shipments are recorded on a tally-in form to which a debit voucher number is assigned. It is the basic receiving document from which the invoice and receipt for property purchased is completed. It is also the source document from which the tub file master Replenisher Cards previously mentioned are punched. It contains pertinent information on the weight and type of containers, freight classification, date received, location of the area, bay, and row or box pallet in which the stock will be stored, original package cost, unit cost and total cost. All of this information is readily available at this time and is punched into the cards for tub file use at the time of issue and for accounting control purposes.

The tally-in is forwarded to the incoming property section after inspection of the stock has been completed, where it is processed against records of stocks due-in, and the necessary forms completed.

TALLY-IN REPORT

CONSIGNOR Ely Lilly Co., New York, N. Y. VETERANS ADMINISTRATION TALLY-IN SHEET Transp. Cost (Stk. Cont. Use) P.P. Debit Vou. No. (27-31) 3642

Acct. No. 1 | Received by | KX CL TL | GBL or Trans. Pro. No. N Y C 74328 | Carrier C. N. J. | Shipping Authority 50-VA-135

TD Code (5) | VA Supply Depot Somerville, N. J. | PP X LCL LTL | Car Number | Seal Members | Date and Time Received 9 A.M. 10/12/50

			FOR STOCK CONTROL USE				FOR OPERATIONS DIVISION OR USE						LOCATION		
STOCK NUMBER (6-7) (8-19)	NOMENCLATURE	Unit	Total Units Rec'd (20-26)	Total Cost (39-45)	Unit Cost (46-51)	Orig. Pack Cost (53-59)	No. of OPs (60-63)	No. Units in OP (64-66)	Type of Cont. (67-68)	Wgt. of Cont. (69-72)	Total Weight	Date of Pack (73-74)	Area (75)	Bay (76-77)	Row or Ex. Plt. (78-79)
1106642	Boric Acid 5lb. Pdr.	Btl.	72	59.04	.82	4.92	12	6	ct.	36	432	50	1	20	80
1106638	Boric Acid 1 lb. Crystals	Btl.	576	92.48	.23	5.52	24	24	ct.	30	720	50	1	20	81
1108700	Caffeine, Citrated 1/4 lb.	Btl.	576	322.56	.56	53.76	6	96	ct.	30	180	50	1	12	23

Container Symbols: Bag BG, Bale BE, Barrel BB, Box BX, Bundle BD, Carton CT, Case CS, Coil CL, Crate CR, Drum DR, Keg KG, Package PK, Piece PC, Reel RE, Roll RL, Sack SK, Spool SP, Tube TU

SVASD-OD-6 (Revised 10-17-50)

The above supplies were checked, verified and classified. All items were received in apparent good condition, except as noted.

DATE 10-12-50 IN CHECKER J. Young

EXHIBIT 6

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The basic action required on each receipt of stock is:

1. Notify central office in order that the vendor may be paid for his goods.
2. Cancel depot due-in cards.
3. If the shipment is not accepted, process as a rejected shipment.
4. Process the completed tally-in in the stock accounting records in order that the receipt will appear as an increase in the stock on hand.

Interrelation of Tub File Records With Control Records

The stock accounting section receives a copy of the tally-in, together with the sample transmittal sheet if stock samples have been consumed in the course of inspection. The samples used in the inspection operation are charged to depot expense and the balance of the quantity is punched into individual master replenisher cards, one card for each item. A stock detail card is also punched for each item, showing the quantity placed in stock. This card is used for control record purposes. The master replenisher cards are sent to the document originating punch which creates credit voucher cards to be filed in the tub files and used in the issuing cycle described under tub file operations.

It will be seen that the tub file is static in that it reflects the quantity and value of stock on hand at any particular moment of time. To chart the ebb and flow of operations throughout the accounting period, a second set of cards is necessary for control purposes. These accounting control cards, the detail cards illustrated in Exhibit 4, which were earlier mentioned with respect to shipping and are mentioned above with respect to receipt, are prepared at the time the credit voucher cards are processed and are balanced against the same controls. Thus this tub file system comprises two sets of punched card records: (1) The credit voucher cards in the tub file itself, (2) the cards which reflect for each item (Exhibit 7) all transactions (receipts, shipments, and adjustments) during the period (Exhibit 4), and the closing balance for the period (Exhibit 7). A set of such cards is maintained for each item in the system. The credit voucher cards in the tub file must agree or be readily reconcilable, with the current Stock Balance Cards (Exhibit 7). The credit voucher cards are used only in the preparation of the shipping documents. All other stock control accounting and administrative reports and records are prepared from the detail cards.

Accounting Records and Reports

Charges to the stores account arise from three main sources: purchase of stock and intra-agency transfers, payment of transportation to the depot which

EXHIBIT 4

STOCK BALANCE CARD

Left Hand Portion

DATE		TYPE ACCOUNT TRANS. STATUS	STOCK NUMBER	STOCK INCREASES	MISC. STOCK DECREASES	DEMAND	
MONTH	DAY					REPL'N. REQUISITIONS	NO. ORDERS
0 0	0 1	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 2	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39						
1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						

Right Hand Portion

ISSUES			INVENTORY BALANCE			
INITIAL AND UNIT ASSEMBLY	REPL'N	TOTAL VALUE ALL ISSUES	QUANTITY	TOTAL VALUE		
		DOLLARS CENTS	ON HAND	NO. MONTHS	DOLLARS	CENTS
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

is added to the value of the stock, and adjustments, principally to round off each unit of issue to the nearest penny. It is the policy of the agency to write all purchase orders for delivery f.o.b. the depot. Consequently, except for the occasional instance where transportation must be paid, the only account payable liability which arises is to outside vendors. This liability is accumulated by tabulating the computed copies of the invoice and receipt for property purchased. Inasmuch as payment for the stock is made in the central office, the depot entry is a charge to stores and a credit to the central office reciprocal account. The central office, upon receipt of the transfer voucher and supporting copies of the invoice and receipt for property purchased, charges the depot reciprocal account and credits accounts payable. Debit and credit adjustments for discount and other reasons arising out of the settlement of the vendor's account, are absorbed by the central office.

The shipping document forwarded to the station from the depot at the time of shipment is used by the station to pick up accountability for stores. The credit is made to the inter-office reciprocal depot account. The depot issues a monthly station issue dollar value report on which the dollar value of all shipments for each individual station are summarized by station number, requisition number, voucher number, sub-object code and dollar value. The report is a monthly statement of the shipments made from the depot. The station reconciles the report with its record of shipments received. The depot uses this report to support a consolidated entry relieving depot stores of the total amount of station shipments as shown on the report and charging the inter-office reciprocal account, supply depot shipments to other stations. In the preparation of the Veterans Administration consolidated statement, the station and the depot reciprocal accounts are washed out and disappear.

An adjustment register is maintained at each depot, ruled to show the date, depot voucher number, depot voucher value, invoice value, adjustment (plus or minus) and the net adjustment for the month. The net adjustment for the month is journalized on the depot general ledger by a debit or credit to current operations. Most of these adjustments arise by reason of the fact that each unit of issue is picked up at its value to the nearest penny. This causes a minor adjustment on many of the shipments received. Write-downs in stock values due to spoilage, damage or other loss must be supported by a survey report approved by the manager of the depot.

Each month a monthly abstract of stock balances report is prepared, which reflects the opening balance of each stock number by quantity and value and the receipts, issues, adjustments and transfers by voucher number. It is not

STORES FISCAL STATEMENT

INVENTORY BALANCE FORWARD/PREVIOUS MONTH			
Issuable Stock	Acct. 1	$25,757,629.62	
Repairable Stock	Acct. 2	804,168.48	
Not Economically Repairable Stock	Acct. 3	22,886.76	
Balance Suspended Pending Inventory	Acct. 4	1,492.07	
Withhold from Issue C. O.	Acct. 5	174,364.18	
Issuable Stock for New Construction	Acct. 6	.....	
Substandard Stock	Acct. 7	.....	
Loan Stock	Acct. 8	.....	
Reserve	Acct. 9	3,052,055.81	
TOTAL			$29,812,596.92
CURRENT MONTH'S DEBIT TRANSACTIONS			
Receipts from Procurement		$1,680,474.60	
Receipts from Stations		143,663.06	
Receipts W/O Reimbursement to Shipper		8,135.22	
Receipts from Other V.A. Depots		31,785.93	
Increase in Valuation of Stock (Price Changes)		247.97	
Inventory Adjustments		343,603.33	
Inter-Account Transfers		1,074,248.37	
			$ 3,282,158.48
TOTAL DEBITS			$33,094,755.40
CURRENT MONTH'S CREDIT TRANSACTIONS			
Replenishment Issues		$ 804,478.82	
Initial Issues		166,986.21	
Unit Assembly Issues (H. & D. E. Funds)		367,828.73	
Shipments to Other Government Agencies		597,603.59	
Shipments to Non-Federal Organizations		196,931.58	
Shipments to Other V.A. Depots		57,834.95	
Inventory Adjustments		537,884.33	
Decrease in Valuation of Stock (Price Changes)		65,150.28	
Inter-Acct. Transfers		1,075,885.65	
TOTAL CREDITS			$ 3,870,584.14
CLOSING INVENTORY AND BALANCE			
Issuable Stock	Acct. 1	$24,426,159.31	
Repairable Stock	Acct. 2	882,578.32	
Not Economically Repairable Stock	Acct. 3	32,288.65	
Balance Suspended Pending Inventory	Acct. 4	70.58	
Withheld From Issued C. O.	Acct. 5	170,159.94	
Issuable Stock for New Construction	Acct. 6	894,334.52	
Substandard Stock	Acct. 7	.....	
Loan Stock	Acct. 8	.....	
Reserve	Acct. 9	2,818,579.94	
			$29,224,171.26
			$33,094,755.40

EXHIBIT 8

only a perpetual inventory of all stock in the depot but a running record of all activity in each item as well. The total of the closing balances on this report must agree with the general ledger balances in the stores accounts.

The monthly depot Stores Fiscal Statement (Exhibit 8) is a condensed statement of depot supply activities supported by the monthly abstract report. It shows the inventory balance at the beginning of the month, to which is added the receipts, adjustments and transfers in, and from which is deducted the issues, adjustments and transfers out. The resulting inventory balance at the end of the period must agree with the balance in the general ledger stores account at the comparable date.

Accounting and Operating Control

The tub file system of stores accounting is a simple and economical means through which the detailed stores records are at all times kept under complete accounting control through continuous integration with the general ledger records. It provides a simple and rapid means of converting the station requisition (order) into a shipping document listing only items and quantities available in stock and furnishing the transportation section and the various storekeepers with all the information needed to perform their duties efficiently. Emphasis is placed on a continuous knowledge of the amount of stock on hand, the location of the stock in the warehouse, the type and weight of containers, transportation facilities and the amount of stock on order.

Accurate and dependable accounting records are produced as the physical movement of stock occurs. Thus management is at all times provided with up-to-the-minute information of the exact status of its stores accounts when it is most useful. All essential information for efficient management is available to the operating and accounting personnel at all times.

As awareness of the accuracy of the accounting records permeates the organization the operation has become more and more self-policing. Since the stock accounts are tied to warehouse location the storekeepers recognize that they are being held accountable for stock received until relieved by a shipping document or a survey report. They will avoid being charged with receiving or shipping errors. The stores accounts on the general ledger are supported by a perpetual inventory which is always in balance. A physical inventory, either wall-to-wall or cycle, can be taken at any time with a minimum of interference with normal operations.

COST ACCOUNTING NOW

WHEN ONE SURVEYS the information needs of management in an half-war, half-peace economy, two major areas of current emphasis are developed. These can be outlined as follows:

1. Analysis and reporting of the change in cost factors caused by the following:
   a. Volume variations.
   b. Change of product mix.
   c. Variance from standards not affected by volume.
   d. Inflationary effects on all expense.
2. Preparation for government regulations:
   a. Are present methods of determining and distributing costs fair, reasonable and recognized by the government?
   b. Is management advised of the types of cost which are either not accepted or severely limited by government audits and regulations?
   c. Have variable cost factors been presented so as to eliminate both over and underpricing of products?

This "memorandum" makes no attempt to be complete or to explore the details of any one question. It seeks only to raise to points of emphasis and perhaps bring to attention some of the current areas in which cost accounting must perform and perform well in 1951. For those who for the first time are meeting the pressures and demands of a nation preparing for an uncertain future, it is essential that an inventory of cost accounting responsibilities be prepared and that a priority be established for those which are the most important. The importance of cost accounting, from a management point of view, varies with the climate of the economic cycle. Today and tomorrow the cost accountant can implement and document many important industrial decisions. Perhaps, too, there is need for a meeting of the minds between industrial cost accounting and the legal definitions of allowable costs in renegotiation, price redetermination and cost-plus-fixed-fee contracts.

Are we ready?

JOHN R. KAHLER, Toledo

POINTS OF V

TAKING THE LESSON TO HEART

WHEN, AND IF, the war fear economy ceases to influence business and some semblance of a buyer's market returns, good businessmen will continue to apply in their businesses the principles for which, in the economy as a whole, the Government's Controlled Materials Plan stands. A good controlled materials plan in any business in a normal or depressed period will include:

1. Accurate sales forecasting.
2. Accurate production planning.
3. Closely controlled investment in inventories and close scrutiny of purchase commitments.
4. Complete product cost information.
5. Exhaustive analysis of material purchase costs and material usage, including research to develop substitute materials of equal utility at lower cost.

The first of these factors, accurate sales forecasting, is less important under present government regulations than in ordinary times, but it will be interesting to note in the months to come whether sales demand for all consumer products is sustained at the presently permitted production rates.

Accurate production planning, as required by CMP, is a handmaiden to sales forecasting. The result of production planning is a better product at a considerably lower cost than would be possible otherwise. Restricting inventory has always

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been a problem with industry. At this point CMP restrictions on inventories conform with business prudence.

Finally, the life blood of progress in product improvement has always been an alert research program in every operation of the business. The question is simply "How much better for less?" Perhaps business can make headway now under CMP, if it asks, not "How long will this control last?" but, "How much more profit can we make by operating under the principles set forth?"

EARL JOHNSON, *Lancaster*

NO TIME TO BE LOST

WRITTEN INVENTORY INSTRUCTIONS lead to clarification of policies which might otherwise never be understood or applied. The written instructions assure that: (1) personnel employed in the inventory process are adequately informed as to procedures, (2) the inventory is completely covered and (3) there is no overlapping of responsibilities.

Careful attention must be given to the preparation of the instructions so that the following major points are covered:

1. **Assignment of responsibility for physical counts**—This includes a listing of all segments of inventory in all locations and the individual responsible for each segment.
2. **Scheduling of physical counts**—This is a statement as to frequency, selection of items and dates for making the counts.
3. **Instructions for counting inventory**—This includes instructions as to physical arrangement, identification and the specific method of counting inventory, as well as provision for proper cut-off of movement of stock.
4. **Instructions for reporting counts**—Forms to be used, the method of summarizing counts, and units to be employed in reporting counts on each item need to be stated carefully.
5. **Listing and pricing inventory**—This is to specify clearly the procedure for comparing counts with perpetual records, investigating and approving differences, and the forms and methods for listing, pricing and preparing summaries for comparison with ledger accounts.

JAMES R. EVANS, *Lancaster*

BUT NOT LEAST

LET US FORGET FOR THE MOMENT the technical phases of accounting and consider other subjects which will play an important part in the ability of the young accountant to demonstrate overall capabilities. These subjects, not necessarily listed in order of importance, are:

1. **Handwriting**—While it is recognized that the accuracy and content of written reports are of prime importance and handwritten material can be typewritten, it is practical to expect that it will be necessary to refer to working papers in handwritten form for some purposes.
2. **English and composition**—To attain a reasonable degree of skill in handling language is to indicate ability to get across to the other fellow the full meaning of information. Skillful use of English, both orally and in the written word, will afford the accountant a two-fold method of accomplishing his purpose.
3. **Salesmanship**—Many good suggestions and constructive ideas are lost when accountants lack the ability to convince their immediate superior that their ideas are worthwhile. An understanding of a few of the basic fundamentals of salesmanship can enable the accountant to contribute constructive proposals which otherwise might remain unpresented.
4. **Industrial engineering**—The broad field of industrial engineering need not be mastered in its entirety by the cost accountant, but he should have a sufficient degree of knowledge to recognize, for accounting interpretation purposes, the basis of the information furnished him by the industrial engineer.

ROBERT O. CAMPBELL, *Philadelphia,*

Budgetary Control Works at Square D Company

by A. A. KASPER

Budget Director and Assistant to the Executive Vice President, Square D Co., Detroit, Michigan

Compactly enunciated, the principles followed by the author's company in its budgeting procedures are set forth at the start of this paper, which carries on to description and illustration of budget reporting forms in use. Brief appraisal of the effectiveness of control of costs through the budget plan, is likewise given.

IN ORDER TO FULLY EVALUATE and give proper perspective to our system of budgetary control, a brief outline of our company background is in order. Square D Company had its inception in 1902 as the McBride Manufacturing Company. In 1909 the present site of our plant was purchased and the name of the company was changed to Detroit Fuse and Manufacturing Company. In 1917 the fuse business was sold and the company name was changed to Square D Company. This is a familiar trade mark today wherever quality electrical distribution equipment is used in home, farm, stores or industry.

Growth of the Company

Since 1917 our Detroit location has expanded to five times its former size and plants have been added at Milwaukee, Wisc., Peru, Ind., Los Angeles, Calif., Seattle, Wash., and Houston, Texas, with foreign plants located at Toronto and Mexico City. These plants are all devoted to the manufacture of electrical distribution equipment and devices, such as switches, circuit breakers, power and lighting panels, motor starters and motor controls, and pressure and regulator switches, both catalogued items and special varieties. Present sales volume amounts to approximately $50,000,000 annually and total personnel employed in carrying on the business is around 4,000, approximately 1,400 of which are employed at Detroit, the headquarters or Home Office of the organization.

Budgeting Principles Applied

Our present system of budgetary control was installed as of January 1, 1946 and superseded our former system which had been in use for approximately fifteen years. Our approach to revision of the budgetary control system was based on the following principles:

1. Account structure must be tied into our budget reporting with respect to proper distribution and uniform classification of expense. Departmental designations must be correctly established without overlap and conflict in lines of authority responsible for control of expense. By that we mean that successful control of expense cannot be expected if departmental designations are so broad that responsibility for control of expenses charged to the department is delegated to more than one supervisor or department head.
2. Account structure must have sufficient detail in expense ledgers to facilitate detail analysis work when required.
3. All expenses reported in the departmental expense must be segregated into two categories so that responsibility for control is clearly defined. This segregation should be between those expenses which are controllable and vary in direct proportion to the selected budget base —direct standard labor hours or dollars, shipments, or any other appropriate base —and those which are not variable in nature and must be absorbed over a period of time, irrespective of volume or output. In our organization this latter type of expense is identified as managerial policy expense.
4. The budget report must prove to be an efficient tool which management and supervision can use to good effect by following the principle of "management by exception." In other words, the major classes of expense should be summarized so that unusual variations from established budgets can be seen without the necessity of reading reams of detail. The attention of the individual responsible for control is focused on the unusual variations rather than on items which are satisfactory and require no further attention.
5. The final budget plan must be one that has the approval and support of management. The finest plans made will not function without the active participation and support of top management.

It may be well to elaborate a little on the two major categories of expense identified in Principle No. 3, managerial policy expense and controllable expense. As stated, in our setup, policy expenses represent those costs which must be absorbed over a period of time irrespective of volume or output. These expenses vary, each according to some influence other than the budget base but not necessarily excluding it. For example, base salary expense of certain key supervision, once established, is constant in amount each month irrespective of the fact that there may be twenty or twenty-five working days in the month. Fixed charges such as rent, depreciation, or taxes should be absorbed over a calendar period, regardless of whether the plant in question is operating at 50 per cent, 70 per cent or 100 per cent of capacity. Other examples of expense in this classification are salary expense of key personnel in our organization (not necessarily supervision), certain overtime premiums, vacation and holiday allowances, bonus compensation, stand-by costs for maintenance supplies, and other services and expenditures charged to manufacturing burden which have been previously approved by management in our annual project program.

In brief, expenses which remain relatively constant are reported as managerial policy and, for practical purposes, represent the cost of maintaining an organization in readiness to serve the needs of production as determined by current sales objectives. When managerial policy expense has been correctly classified, we can then determine the nature of controllable expense, the type

Square D Company

MONTHLY STATEMENT OF EXPENSE

DEPARTMENT No. 24 DEPARTMENT NAME Machine Shop SUPERVISOR Joe Doaks PLANT Detroit

MONTH OF October — YEAR TO DATE THRU—October 31

Month Actual	Man-agerial Policy	Controllable Expense Actual	Controllable Expense Policy	Description of Expense Account	Total Actual	Man-agerial Policy	Controllable Expense Actual	Controllable Expense Policy
700	700			Officials — Gen. Superv'n	7,000	7,000		
150		150	145	Indirect—Office	1,500		1,500	1,570
1,200		1,200	1,150	Indirect—Factory	15,000		15,000	14,850
500	400	100	85	Overtime Allowance	6,000	4,000	2,000	2,100
3,000	3,000			Vacation Holiday Allowance	30,000	30,000		
150	150			Other Compensation	2,000	2,000		
1,375	15	1,360	1,340	Payroll Taxes	15,000	150	14,850	15,600
195	5	190	185	Workmen's Comp. Insur.	2,200	50	2,150	2,250
7,270	4,270	3,000	2,905	TOTAL INDIRECT	78,700	43,200	35,500	36,370
5		5		Office Supplies & Stat'y	5		5	
470	20	450	500	Manufacturing Supplies	5,500	200	5,300	4,750
365	15	350	390	Small Non-durable Tools	4000	150	3,850	3,780
840	35	805	890	TOTAL SUPPLIES	9,505	350	9,155	8,530
900	200	700	703	Electricity	9,500	2,000	7,500	7,870
				Fuel				
				Water				
200		200	197	Gas	2,100		2,100	2,000
1,100	200	900	900	TOTAL UTILITIES	11,600	2,000	9,600	9,870
				Maintenance of				
9,000	3,000	6,000	5,800	Tools, Dies, Jigs & Fixtures	87,000	27,000	60,000	57,000
20		20	15	Buildings	100		100	150
3,000	800	2,200	2,100	Machinery & Equipment	37,500	7,500	30,000	31,250
10		10	3	Office Furniture & Fixtures	100		100	87
200	200			Moving & Rearranging	3,300	3,300		
				Boilers & Heating				
150		150	120	Small Non-durable Tools	2,000		2,000	2,100
12,380	4,000	8,380	8,038	TOTAL MAINTENANCE	130,000	37,800	92,200	90,587
100	100			Rentals	1,000	1,000		
100	100			Insurance	1,000	1,000		
2,500	2,500			Taxes	25,000	25,000		
2,000	2,000			Depreciation	20,000	20,000		
4,700	4,700			TOTAL FIXED CHARGES	47,000	47,000		
				Design Modification				
22		22	17	Telephone & Telegraph	210		210	185
900	400	500	423	Loss Due to Error	7,500	500	7,000	7,350
				Association Expense				
20		20	10	Miscellaneous	90		90	120
942	400	542	450	TOTAL MISCELLANEOUS	7,800	500	7,300	7,655
				REDISTRIBUTED EXPENSE				
27,232	13,605	13,627	13,183	TOTAL EXPENSE	284,605	130,850	153,755	153,012
		40,000	41,200	Std. Direct Labor Hours			432,000	412,000
		97.0%					105.0%	

Note: Certain captions, without amounts, omitted above.

EXHIBIT 1

of expense for which the department head or foreman is directly responsible. These expenses vary in direct relation to the budget base, which may be standard direct labor hours or shipments. The above segregation clearly defines primary responsibility for control as between top management and the department head or foreman.

Principal Budget Reports

Now that the principles underlying the system of budget control have been reviewed, let us skip over many intervening steps to the budget report. Exhibit 1, Monthly Statement of Expenses, is a typical departmental expense report. It will be noted that the statement itemizes expense accounts grouped into six major classifications: indirect labor, supplies, utilities, maintenance, fixed charges, and miscellaneaus.

The form arrangement provides for reporting separately monthly and year-to-date expenses, each further columnized into actual expense reported, managerial policy portion of actual expense, controllable portion of actual expense and, in the last column, the controllable budget established for the period based upon the volume of activity experienced in the department for the current budget period (year-to-date columns have been omitted from Exhibit 1 as there noted). Comparison of the budgeted total column with actual controllable expense total for the period, indicates at a glance whether overall performance is favorable or unfavorable. If unfavorable, review of the major expense classifications will indicate quite readily the source of the difficulty.

A plant-wide summary in the same form is also utilized. It is submitted for use by our top management and manufacturing management. In addition to the detail shown on the department budget sheet, the plant-wide report shows burden absorption. With this type of reporting, we are able to inform management of the effect of volume on manufacturing costs. In the case where burden under-absorption is experienced, we can advise management as to the amount caused by failure to attain or meet controllable estimates and the amount of policy expenditures not absorbed due to calendar variations. With reporting conducted in this manner, the attention of management is directed to the fact (when it is the case) that our manufacturing burden costs are being crowded or loaded with expense and that a situation is being created which can only be corrected by long-range planning and changes in management policy.

Exhibit 2 is a summary of budget performance by lines of responsibility. This summary contains the following information:

DIVISION B

SUMMARY OF DEPARTMENTAL BUDGET REALIZATION

BY LINES OF RESPONSIBILITY

DEPT.	DESCRIPTION	DEPT. HEAD	SEE NOTE* MONTH OF VARIABLE EXPENSE ACTUAL	BUDGET	VARIATION	PERCENT OF BUDGET REALIZED
18	Inspection	James	8,190	6,870	1,320	83.9
23	Box Assembly	Smith	11,850	10,915	935	87.9
24	Mach. Shop #1	Burns	16,760	15,380	1,380	91.8
25	Power Panel & Sw. Board	Jackson	2,611	2,844	<233>	108.9
26	Large Sw. Ass'y.	Kelly	1,337	2,379	<1,042>	165.6
27	Breaker Ass'm.	Brown	1,280	1,255	25	98.1
28	Plating	Williams	3,008	2,611	397	86.8
29	Small Sw. Ass'm.	Allen	2,526	2,163	363	85.6
	Productive Sub-Total		47,562	44,417	3,145	93.4
09	Order Scheduling	Johnson	6,234	6,376	<142>	102.2
14	Planning	Jenks	5,795	5,929	<134>	102.3
15	Production Engineering	Jameson	20,832	19,288	1,544	109.9
16	Purchasing	McKay	4,525	4,977	<452>	92.6
19	Maintenance	King	3,550	2,769	781	80.3
20	Shipping	Wallace	28,200	31,374	<3,174>	111.2
21	Receiving	James	2,523	2,958	<435>	117.2
22	Tool Room	Hammond	3,399	2,061	1338	60.6
33	Stores	Hobbs	2,500	2,650	<150>	106.0
34	Power House	Hardt	1,558	1,550	8	99.5
35	Material Transport	Welsh	3,400	3,350	50	98.5
36	General Manufacturing	James	8,000	8,100	<100>	101.5
	Non-Productive Sub-Total		90,516	91,382	<866>	101.0
	Grand Total Manufacturing		138,078	135,799	2,279	98.3
	Chief Engineer:					
11	Design Eng.	Denning	2,361	2,847	<486>	120.5
17	Research Eng.	Allison	2,992	3,042	<50>	101.0
	Total		5,353	5,889	<536>	110.0
	Sales Manager:					
	Panel Section	Sley	9,513	10,891	<1,378>	114.4
	Advertising	Piner	2,207	2,324	<117>	105.0
	Gen. Sales	Hall	58,290	57,550	740	99.0
	Total		70,010	70,765	<755>	101.1
	Treasurer:					
	Cost & Payroll	Wood	6,450	6,510	<60>	100.5
	General Accounting	Hadley	4,781	4,731	50	99.0
	Total		11,231	11,241	<10>	100.0
	Grand Total All Depts.		224,672	223,694	978	99.6

*In the complete form these columns repeated for the year to date.

EXHIBIT 2

1. Name of department.
2. Name of department head.
3. Actual variable expense.
4. Variable budget.
5. Budget attainment.

} For the period and year-to-date.

This report has proven to be a time-saver for top management in that attention is focused on those departments in which expense control performance is not up to par. It also aids in determining reasons for this condition. This eliminates the necessity for reviewing approximately forty individual reports to determine what departments are having trouble with control of operating costs.

Additional Reports

At the end of each period, in addition to the above reports, a summary analysis of manufacturing expense is prepared which briefly condenses on an 8½" x 11" sheet, the highlights of current month's experience. This report notes the number of work days in the period, shows total manufacturing costs per standard hour broken down into policy expenditure costs and variable costs, and compares these with prior periods. Unusual fluctuations in volume or cost are explained and brief comments are made on over-all budget performance.

Another supplemental report is an analysis of departmental budget variation and is furnished to each department head. This analysis reflects the budget variation for the month and also shows where it occurred and gives a brief explanation of the reason for the variation. After a week's interval, a monthly budget meeting is held with manufacturing department heads to review these variations and also to determine first hand what is going to be done to correct unfavorable conditions.

The reports described above, cover all monthly accounting periods. In answer to the criticism usually leveled at this type of reporting because of time delay, we wish to point out that we also have a weekly budget labor report. This weekly report is prepared on the form which is illustrated in Exhibit 3 and summarizes for a weekly period labor hours expended in a department compared to budget hours allowed for the period. We feel that from a control standpoint, a weekly report on labor is sufficiently current for effective control purposes. Inasmuch as indirect labor represents approximately 60 per cent of our total manufacturing burden, we have covered through this report the largest item of expense, on a weekly basis.

Switch & Panel Division
WEEKLY LABOR REPORT

HOURS ☐
AMOUNT ☐

WEEK ENDED MAR. 27, 1949 DEPT. 24-000	DESCRIPTION	AC OR LINE	MONTH TO DATE DEPT.
3,800.50	TOTAL ACTUAL DIRECT	A	15,137.25
3,599.10	Production Credits	B	14,168.03
305.58	Work in Process	C	1,346.75
928.32	Allowances	D	3,762.71
4,833.00	Volume Produced on Std.	E	19,277.49
<1,032.50>	Direct Labor Variation	F	<4,140.24>
127.70	EFFICIENCY (E ÷ A)	G	127.90
	Supervision	010	
88.48	Indirect	030	532.47
	Overtime Allowance	050	
88.48	INDIRECT—ACTUAL	H	532.47
86.67	INDIRECT—BUDGETED	I	341.17
1.81	INDIRECT—VARIATION	J	191.30
298.89	Tool & Die Maintenance	400	1,179.43
4.00	Building Maintenance	402	33.00
140.04	Machinery & Equipment	404	357.47
	Furniture & Equipment	406	
	Moving & Rearranging	410	
	Small Non-Durable Tools	451	
442.93	MAINTENANCE—ACTUAL	K	1,569.90
458.92	MAINTENANCE—BUDGETED	L	1,806.56
<15.99>	MAINTENANCE—VARIATION	M	<236.66>
25.78	Losses Due to Error	390	128.58
40.08	Losses, Req'd. Tool Repair	391	226.06
65.86	MISCELLANEOUS—ACTUAL	N	354.64
65.29	MISCELLANEOUS—BUDGETED	O	257.00
57	MISCELLANEOUS—VARIATION	P	97.64
	Labor Allowances	682	
76.05	Order Quantity Changes	— 1	225.47
14.00	New Operators	— 2	101.41
	Changes in Methods		
22.25	That Will Be Made Standard	— 4	171.48
52.13	Temp. Abnormal Conditions	— 5	210.17
	Maintain Efficiency or Guaranteed Rate	— 7	593.00
64.60	Material Shortages	— 8	160.48
<106.93>	Std. Time Changes Not Included in St. Cost	— 9	1.39
57.81	Set Up Allowance	—11	278.44
42.52	Prod. Group Inspection	—13	174.46
	Track Breakdown	—14	
16.80	Miscellaneous	—18	64.56
1.75	Substitution of Materials	50	12.48
240.98	TOTAL ALLOWANCES	Q	1,993.34
269.93	ALLOWANCES BUDGETED	R	961.53
<28.95>	ALLOWANCES—VARIATIONS	S	1,031.81
6.7	ALLOWANCES, % TO DIRECT	T	14.1
597.27	TOTAL INDIRECT—ACTUAL	U	2,457.01
610.88	TOTAL INDIRECT—BUDGETED	V	2,404.73
<13.61>	TOTAL INDIRECT—VARIATION		52.28
<47.28>	682-6		<901.23>

EXHIBIT 3

The Budget for the Coming Year

Budgets in use are reviewed each year and are revised to meet changing conditions and anticipated levels of operation in the ensuing budget period. Schedules of expense are prepared by the budget department showing annual expenditures for the past three years. The proposed budget for the following year will reflect the total expense contemplated, segregated into policy expenditures and variable expense. Another column reflects increases or decreases in the proposed budget as compared to experienced costs. There are additional columns for insertion of variable ratios and also explanations for increases or unusual decreases. The department head concerned takes a very active part in the preparation of this proposed budget. He is given an opportunity to agree or disagree with the final estimate. After agreement is reached, the proposed budget must be approved by his superior and top management before it becomes effective.

When we say top management approves the budget, we are referring to a budget in summary form. When a summary of budgets is submitted, there is also presented a break-even chart showing prospective results of the proposed budget on predetermined sales objectives for the period in question, as well as a condensed profit and loss forecast reflecting the profit position for the coming year. management is then in a position to determine whether the profit position is satisfactory on the basis of the proposed budget. Management is also in a position to approve or reject the requests for projects desired for the same budget period.

It is appropriate, at this point, to consider what degree of expense control we have achieved through our methods. In terms of budget cost objectives, our annual realization is expressed in the following percentages:

Year	Per Cent of Budget Realized
1946	87%
1947	101%
1948	96%
1949	98%
1950	99.85%

The Mechanics of Budget Statements

One of the problems originally encountered in the preparation of budget statements was the situation that all figures for actual expense had to be transcribed from ledgers to a budget work sheet which also carried budget figures for the period. After all handwritten detail was transcribed and comptometer-checked with respect to extensions and additions, totals were verified to deter-

mine that they agreed with predetermined ledger controls. Upon completion of this operation, a typist proceeded to type all handwritten data on the same type of budget sheets and again the figures were checked and verified.

This time-consuming practice was eliminated by use of ozatian printed sheets for pencil transcription of data in the first instance. Once the figures are verified, this sheet is used as a master to obtain as many blue line ozalid copies as desired, thus eliminating the tedious task of typing and rechecking which required about two days' work for reports at a time when speed was needed to meet monthly schedules for preparation of operating statements. This same principle has been applied with considerable success to all other operating statements where copies are required.

Four Rules for Effective Budgeting

In summing up, there are several basic points to remember for successful budgetary control:

1. Budget control must have the enthusiastic support of management. Without such support, there are two strikes against the plan before it starts.
2. The budgets to be used must be validated by personnel charged with responsiblity for control.
3. Systematic follow-up of variations from budget must be made each month to obtain positive action in correcting unfavorable performance.
4. Recognition of good work done in control of variable expense by department heads and foremen is an incentive to these men and becomes a positive factor in successful budgetary control. Recognition is of a tangible nature and is expressed through the operation of our Department Heads Bonus Plan which was described in detail in November 1950 issue of the *N. A. C. A. Bulletin*.

Simplifying the Detail Side of Expense Control

by H. C. ARNOLD

Senior Budget Engineer, Camera Works, Eastman Kodak Company, Rochester, New York

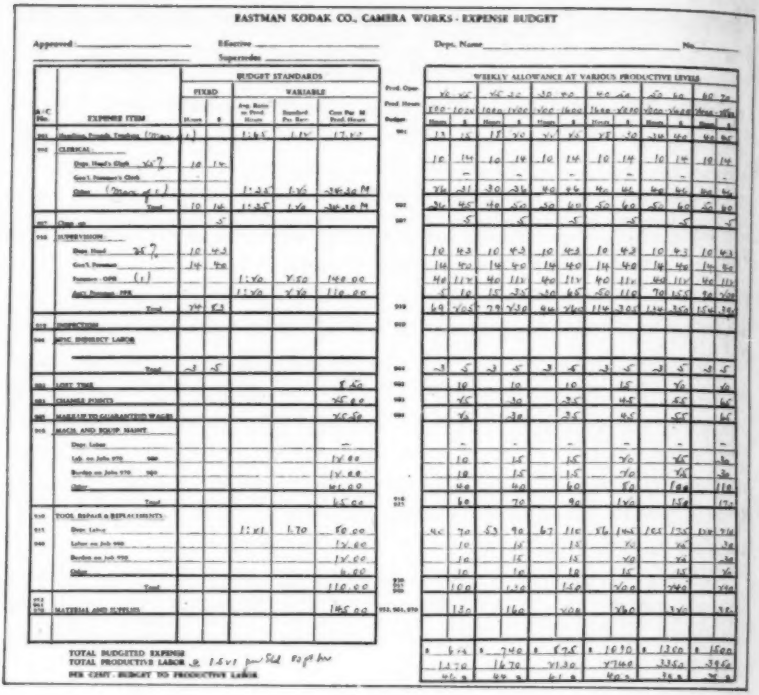
Budget allowance at successive levels of operation, so presented that foremen and department heads can use them in their planning and make them their own in a very real sense, feature the budgeting and budget reporting methods outlined in this article. Three key forms are offered by way of illustrations.

ONE OF THE MAIN OBJECTIVES in the design of our expense control system is to provide the person directly responsible for meeting an expense budget with a simple tool enabling him to determine, in advance, his own budget at any given level of activity. We wish also to supply him with a report of his performance against his budget standards as quickly as possible and with the least amount of clerical work. Our method of accomplishing this dual purpose is the subject of this paper. The forms illustrated have been used effectively in our plant and may be adaptable for use in similar plants.

We are a typical small parts manufacturing and assembly plant, employing approximately five thousand people at normal capacity and we have established, for control purposes, some seventy departments on a functional basis. Direct labor is controlled by a wage incentive plan, using a point system. Each production department's indirect labor and other expenses are controlled by means of fixed and variable expense budget standards related to the department's activity as measured by standard production hours equal to eighty points each. Staff and service department expenses are related to the activity of the departments which they serve or to over-all activity. Departments vary in size from ten to four hundred employees. Our year is divided into thirteen periods.

Three Manually-Entered Nearest-Dollar Control Forms

The forms presented here are used for all types of departments. Exhibit 1 is an Expense Budget showing weekly allowances at successive production levels. Exhibit 2 is a Weekly Expense Chart reporting budget performance for department labor items. Exhibit 3 is a Periodic Report of Budget Performance for all expense items. In the interests of economy and speed in preparation of these reports, eliminate the typing of figures, entering them manually and carrying them to the nearest dollar only.



EASTMAN KODAK CO., CAMERA WORKS - EXPENSE BUDGET

Approved: _____ Effective _____ Dept. Name _____ No. _____

Supersedes _____

A/C No.	EXPENSE ITEM	BUDGET STANDARDS FIXED H-rate	FIXED $	VARIABLE Avg. Rate on Prod. Hours	VARIABLE Standard Per Rate	VARIABLE Cost Per M Prod. Hours
001	Handling Female Trainees (Hours)	1		1:63	1.17	17.57
002	CLERICAL					
	Dept. Head's Clerk 35%	10	14			
	Gen'l. Foreman's Clerk	—	—			
	Other (Hours of 1)			1:25	1.76	-36.36 M
	Total	10	14	1:25	1.76	-36.36 M
007	Clerical		5			
008	SUPERVISION					
	Dept. Head 35%	10	43			
	Gen'l. Foreman	14	98			
	Foreman - Day (1)			1:76	9.50	168.00
	Asst. Foreman - Day			1:76	9.50	168.00
	Total	39	84			
009	INSPECTION					
010	MISC. INDIRECT LABOR					
	Total	3	5			
011	LOST TIME					8.50
012	CHARGE POINTS					35.00
013	MAKE-UP TO GUARANTEED WAGES					70.50
015	MAGN. AND EQUIP. MAINT.					
	Dept. Labor					—
	Lab. on Jobs 970 900					14.00
	Burden on Jobs 970 900					14.00
	Other					41.00
	Total					65.00
016	TOOL REPAIR & REPLACEMENTS					
017	Dept. Labor			1:41	1.70	98.00
018	Labor on Job 900					14.00
	Burden on Job 900					14.00
	Other					4.00
	Total					110.00
022						
023	MATERIAL AND SUPPLIES					185.00

TOTAL BUDGETED EXPENSE

TOTAL PRODUCTIVE LABOR @ 1.61 per Std Prod Hr

PER CENT. BUDGET TO PRODUCTIVE LABOR

Prod. Oper.

Prod. Hours

Budget

WEEKLY ALLOWANCE AT VARIOUS PRODUCTIVE LEVELS

001	13	15	17	20	23	25	27	30	32	34	37	40
	10	14	10	14	10	14	10	14	10	14	10	14
	—	—	—	—	—	—	—	—	—	—	—	—
	26	21	30	34	40	44	40	44	40	44	50	54
002	36	35	40	50	50	60	50	60	50	60	60	68
007		5		5		5		5		5		5
	10	43	10	43	10	43	10	43	10	43	10	43
	14	98	14	98	14	98	14	98	14	98	14	98
	40	112	40	112	40	112	40	112	40	112	40	112
	5	84	15	252	30	665	50	840	70	1176	90	1512
009	69	1265	79	1538	94	1960	114	2303	134	2639	154	3038
010												
011	-3	5	-3	5	-3	5	-3	5	-3	5	-3	5
012		18		10		10		15		20		20
013		35		50		35		45		55		65
015		70		70		35		45		55		65
		—		—		—		—		—		—
		10		15		35		70		95		35
		18		15		35		70		95		35
		40		40		60		80		108		118
016		68		70		90		140		158		173
017	46	70	53	90	67	110	76	140	105	175	120	210
018		10		15		15		20		20		30
		10		15		15		20		20		30
		10		10		10		15		15		15
022		100		130		150		200		240		288
023		130		160		200		280		320		376
	$ 614	$ 740	$ 875	$ 1090	$ 1250	$ 1500						
	1270	1670	1930	2460	2850	3496						
	48.3	44.3	45.3	44.3	43.9	42.9						

EXHIBIT 1

The Foreman Can Work His Own Allowances

As mentioned above, the information on Exhibit 1, which is in essence a step chart, enables the operating foreman to determine, at a glance, his expense budget in advance of actual production. How well he makes use of this chart generally determines how well he meets his budget. The accountant responsible for issuing reports of budgetary performance also uses the chart in determining quickly the proper expense budget against actual production figures are to be charged, as well as in forecasting burden rates against projected production.

The itemization and figures shown in Exhibit 1 indicate that it is a chart which might be set up for a small production department. (The figures are for example only and do not necessarily correspond to actual figures). It will be noted that the chart is divided into two sections. The section on the left shows the budget standards for each expense account. These standards originate in

time and methods studies made with the full co-operation of the individual responsible for meeting them. On the right the standards are translated into weekly allowances, both in hours and dollars for various production levels.

These steps or brackets in production level can be expressed in terms of number of production operators, production hours or any other index on which the budget allowance is based. For use in production departments, the brackets are generally in steps of five operators or two-hundred standard production hours (forty hour week) for levels below thirty operators, and in steps of ten operators or four-hundred standard production hours for levels above thirty operators. The budget allowance is based on the median volume representative of the bracket. For example, the allowance for the first bracket shown in Exhibit 1 is based on nine hundred production hours while in the last bracket it is based on twenty-six hundred production hours.

The activity span covered by individual brackets varies with different sets of conditions but is generally dependent upon two major factors. These are (1) the degree of correlation between the expense and the index used for budgeting it and (2) the amount of expense related to the given base. The higher this degree of correlation or the higher this percentage of expense to the base, the narrower the breadth of the bracket. For example, in an automatic screw machine department, there is a close relationship between the number of production hours and the expense, as well as a high percentage of expense related to production hours. In this case we would use a narrow bracket not exceeding 200 hours. However, in budgeting an office staff department, such as production control, and using total plant direct labor as a base, we would employ a wide bracket to compensate for the fact that there is a lower degree of correlation and a lower percentage of expense to the base than there is in the case of operating units like the automatic screw machine department.

The budget step chart lends itself readily to presentation of fixed, semifixed and variable costs. Each expense item can be shown in the relationship to the base. The fully variable items vary with each bracket, whereas the semivariable items vary with every two, three or more brackets. The fixed items, of course, remain the same for all brackets. Certain minimum and maximum allowances can also be set up within the variable and semivariable items. When the step chart is complete, one can read at a glance the budget for a given production level. In practice, the budgetary control department works up this step chart using pencil figures and a form printed on vellum from which ozalid copies are run. Minor changes in the standards can easily be made on the master form without re-writing the entire master, and new copies run. As the super-

visor plans his production man-hour needs, he can determine what his limits of expense should be by a simple reference to the step chart.

A Head Start on Departmental Labor Cost Control

How efficiently an operating foreman follows his expense budget step chart is reported weekly on the form shown in Exhibit 2. This report is confined to labor items, which represent the major portion of department expense. (Material items are included in the final periodic report of budget performance, to be discussed presently). Exhibit 2 is designed particularly for the use of the operating foreman, although it is passed down to him through other department supervision. It shows in successive columns the departmental production activity (budget and actual), a summary of budget performance comparing total budgeted and actual dollars and, similarly, detailed budget performance for each expense labor item. There is a line for each week of the year. To avoid a wide form resulting from distribution columns for each expense item

EASTMAN KODAK CO. - CAMERA WORKS

Weekly Expense Chart - Labor Charges Only - Dept. No. _____

PERIOD / WEEK	Budget Base: Std. Prod. Hours	Point Base	Act. Prod. Hours	TOTAL Budget $	TOTAL Actual $	TOTAL Over or Under	901 Handling, and Trucking Budget $	901 Actual $	901 Over or Under	902 Clerical Budget $	902 Actual $	902 Over or Under	907 Clean-Up Budget $	907 Actual $	907 Over or Under	918 Supervision Budget $	918 Actual $	918 Over or Under
1-1st	850	58	770	675	455	(220)	15	10	(5)	45	43	✓	5	4	1	165	147	(18)
1-2nd	1190	90	1060	600	508	(92)	10	14	(4)	50	45	5	5	4	1	130	166	(36)
1-3rd	1440	91	1090	576	580	(4)	16	14	1	60	56	✓	5	4	1	160	176	(16)
1-4th	1510	59	1330	576	571	4	16	17	1	60	58	✓	5	5	–	130	165	(35)
2-1st	1816	58	1650	625	447	41	20	16	✓	60	53	7	5	5	–	200	196	16
2-2nd	1930	87	1770	695	705	(10)	20	21	(1)	60	58	✓	5	4	1	205	222	(17)
2-3rd	1800	85	1640	615	799	16	40	36	4	60	58	✓	5	4	1	260	241	1
2-4th	1830	88	1670	615	815	(3)	40	38	✓	60	65	(5)	5	5	–	260	243	1
3-1st	1450	91	1560	730	917	13	45	37	8	60	65	(5)	5	4	1	295	367	71
3-2nd	1760	94	1640	730	914	16	45	39	6	60	65	(5)	5	6	(1)	295	375	79
3-3rd	1620	90	1950	715	710	5	40	38	✓	60	58	✓	5	5	–	250	360	(110)
3-4th	1770	87	1630	695	661	34	30	35	(5)	60	58	✓	5	3	✓	200	190	15
4-1st																		
4-2nd																		
4-3rd																		

EXHIBIT 2

on one sheet, four large size sheets are bound together to make up the report. Only the initial distribution columns appear on Exhibit 2.

This weekly report is especially important to the foreman, as it gives him a check on his operations well in advance of the final periodic report issued to higher levels of supervision. It is available to him within five days following the end of the week reported. In order to obtain a closer control of trouble spots, the foreman may break down the weekly allowances shown on his step chart into daily allowances. In any event, the foreman knows that, if his weekly budget is operating within the step chart allowances, he will have very

EASTMAN KODAK CO. - CAMERA WORKS

Periodic Report of Budget Performance for Year 19 _____

Department _____

(Summary Sheet)

INDEX OF ACTIVITY

PERCENTAGE OF EXPENSE TO DIRECT LABOR

P E R	Period: Standard Prod. Hrs.	Period: Actual Prod. Hrs.	Period: Direct Labor	Year to Date: Standard Prod. Hrs.	Year to Date: Actual Prod. Hrs.	Year to Date: Direct Labor	Period: Budget 00.00%	Period: Actual 00.00%	Year to Date: Budget 00.00%	Year to Date: Actual 00.00%
Last Year	8744	7403	$ 13075	113 67X	93639	$ 169975			39.56	39.60
1	4790	4260	7486	4790	4260	7486	42.89	44.17	42.89	44.17
2	8140	7480	17381	12930	11740	19667	38.77	38.16	40.30	40.38
3	9130	8180	14089	22060	19940	33706	38.64	39.79	39.66	39.30
4										
13										

SUMMARY OF BUDGET PERFORMANCE

Reviewed by:

P E R	Period: Budget	Period: Actual	Period: Over or Under	Year to Date: Budget	Year to Date: Actual	Year to Date: Over or Under
Last Year	$ 5174	$ 5704	$ (53)	67 744	67658	$ (86)
1	3116	3219	(103)	3115	3218	(103)
2	4780	4725	55	7895	7943	(48)
3	5390	5306	84	13 785	13749	36
4						
13						

G.R. 19

(Portion of Detail Sheet)

P E R	Budget	Actual	Over or Under: Period	Over or Under: To Date	Comments
901 - Handling, Errands & Trucking					
1	$ 85	$ 90	$ (5)	$ (5)	
2	140	133	7	2	
3	160	149	11	13	
4					

P E R	Budget	Actual	Over or Under: Period	Over or Under: To Date	Comments
918 - Supervision					
	$ 955	$ 1064	$ (109)	$ (109)	
	1310	1276	34	(75)	
	1445	1393	52	(23)	

EXHIBIT 3

little explaining to do when the period report is submitted to higher supervision.

The weekly report is returned to the budgetary control department at the end of each week for entry of a new week's figures. Budget figures are taken directly from the step chart bracket in which the production hours fall. Actual cost

figures are obtained from an expense distribution run made from punched cards on tabulating machines. For ease of reading, budget figures are written in green, actual cost figures in ink, the over-expended figures in red and the under-expended figures in black. (In Exhibit 2, it has not been practicable to reproduce this coding but over-expenditures have been circled.)

One Report for All Expenses for Each Period of the Year

The Periodic Report of Budget Performance, Exhibit 3, is a complete report of expense, designed to record a department's operating performance by period for the entire year. Like Exhibit 2 the form consists of four sheets fastened together. The top sheet is a summary of over-all performance which is supported by the detailed accounts listed on the remainder of the sheets. Exhibit 3 is confined to the top sheet and the upper portion of the first succeeding sheet (all of these are similar). These reports are submitted to department heads following the close of each accounting period and remain in their possession until the close of the next period. At that time they are returned to the budgetary control department so that figures for the new period may be recorded.

An examination of the top or summary sheet of the report will show that it is divided into three major sections listing figures for each period (successive lines) as well as year to date. One section lists the index of activity for the particular department for each period. The second lists the period-by-period percentages of expense to direct labor. The third lists the summary of budget performance. Having the entire year's operation thus recorded in one report has proven to be very effective. Prior to the design of this form, we issued typewritten reports covering one interim period only, with year-to-date totals. For reference purposes, it was necessary to thumb through successive sheets to review a department's operations period-by-period for the year.

The Forms are Serviceable for Still Other Reports

The summary sheet shown in Exhibit 3 is used separately for other reports. These reports vary with levels of supervision. For instance, the report submitted to general superintendents will contain individual summary sheets for each superintendent reporting to him, supported by individual summary sheets for each department head. The plant manager may be more interested in the grand summary sheet for the plant, supported by individual summary sheets for each of the general superintendents.

It may be mentioned also that all of the forms which have been exhibited are used for the budgetary control of general overhead items as well as that of department expense.

Forecast Budgeting for a Multi-Plant Operation

by WILLIAM J. TAGTMEIER

Budget Supervisor, Deere & Co., Moline, Ill.

Among other features of the orderly budgeting routine here described for a company in which primary control functions are decentralized, there may be noted the interim "profit budgets" submitted by the factories to answer the difficult how-are-we-doing-according-to-plan question. A brief view of cash position and capital expenditure control routines is also given.

A COMPANY OPERATING SEVERAL PLANTS and branches must have a budget for the company as a whole as well as for each unit. In order that this company-wide budget may be prepared, it is necessary that the various locations submit data regarding their operations to the central or home office. It is with this phase of budgeting that this paper is concerned.

The methods and forms which will be described are being used in the company by which the writer is employed. There are sixteen John Deere factories and numerous sales branches. These units employ from 200 to 8,000 employees apiece. All of these plants and branches are almost completely decentralized from the home office in Moline. The employees who carry on the budgeting and accounting activities at the various plants and branches are responsible to the general managers there. The comptroller in the home office has the responsibility for directing the budgeting and accounting activities in a manner to aid in making this large group of decentralized organizations function as an efficient whole.

Objectives of Budgets and Forecasts Submitted

The budgets which the various decentralized plants and branches prepare for the home office are more particularly devoted to looking ahead and reporting on performance according to plan than to immediate control matters. They fulfill the following needs:

1. Provide reliable budgetary data which the home office must have in order to chart the financial course of the company most effectively.
2. Provide the local manager with a yardstick which he knows the home office will examine critically at the time the data is submitted and will measure later against actual results.

It might be well to add at this point that the various plants and branches operate departmental budgets and keep other budgetary data for the purpose of controlling their own operations. This phase of budgeting is under the jurisdiction of the local managements.

Cash Forecasting

Necessarily the company's cash position is centrally controlled at the home office. (Cash balances at the various locations are limited mainly to working funds.) The business is highly seasonal, with inventories and receivables usually quite high in the spring. Consequently, seasonal bank loans are sometimes necessary. Needless to say, the factories and sales branches must be relied upon for accurate forecasts of cash needs and operating budget data if cash is to be controlled effectively and borrowing kept to a minimum. To render this possible, reports are made to the head office.

Each of the locations mails the home office a cash statement on Friday afternoon. These statements are consolidated at the home office on Monday morning. Thus, a consolidated statement of cash position and cash requirements as of the close of business on Friday is available on Monday at the home office. The sales branches furnish the home office with a collections forecast on the first of each month for the three months to follow. This is the most difficult part of our cash forecasting because farm equipment dealers are allowed fairly long terms for settlement.

Capital Expenditures Budgeting

Capital expenditures usually involve large sums of money which must be obtained from the profits of the business or from other financial arrangements. In our company, no commitments for property and equipment or for extraordinary expense items may be made unless the required Appropriation for Expenditure (Exhibit 1) has been prepared and approved.

Definite rules have been set up to govern the approvals of requests for capital expenditures. Local managers grant approvals for items under $1,000 and vice-presidents grant approvals for items from $1,000 to $5,000. An appropriations committee composed of officers of the company acts for the board of directors on items from $5,000 to $100,000. Items over $100,000 are acted upon by the board. Overruns must be approved in the same manner as original requests.

The general subject of capital expenditures is studied well in advance of each year in the light of need and business conditions and a policy for the year formed. Next, an estimate of the funds required to carry out this policy is made. This estimate is inserted in the cash budget expenditures column and is, of course, a very important figure in connection with forecasting future cash balances. Capital needs are watched constantly and new estimates are made whenever necessary.

DEERE & COMPANY

APPROPRIATION FOR EXPENDITURE

Subsidiary	AFE No.
Authority is Asked for Expenditure of	Date of AFE
For:	

Reasons:

Project No. (All AFE'S Showing Project Number Are to Be Reported on Form M-2510)	Approved: FACTORY OR BRANCH
Expenditure on Above to Be Charged to:	_____ Date _____ _____ Manager Date _____
	Approved: DEERE & COMPANY
	Board of Directors Date _____
	_____ Appropriation Committee Date _____
	_____ Vice-President Date _____
	_____ Engineering Dept. Date _____
Approved: _____ Factory or Branch Auditor	_____ Laboratory Dept. Date _____

EXHIBIT 1

Operating Budgets—Volume

The first sales and manufacturing schedules for a fiscal year are prepared about five months in advance of the first of the year. The manager of each sales branch furnishes the home office with an estimate of what his territory will require from the factories during the coming year. These estimates are reviewed by the scheduling committee and other interested employees of the home office, after which they are consolidated to form a schedule of potential sales for the entire company. Each of the branch estimates and the consolidated sales estimate is divided by factory lines.

Copies of the branch estimates and the consolidated sales estimate applicable

to each of the factory lines are furnished to the managers of the related factories. Based on this information, the factory manager and his staff prepare a proposed manufacturing schedule by months and forward it to the home office scheduling committee for approval. The manufacturing schedule is thereupon reviewed by the committee. Its approval is the factory manager's green light to proceed with purchasing and production plans for the coming year. The production data by months, reflected in the plant schedules, is assembled at the home office and notification made to the sales branches of their allocations and quotas of the various items of farm equipment by months.

These initial sales estimates and manufacturing schedules are subject to revision any time before the start of or during the year. A proposal to change may be made by any of the managers and is directed to the home office scheduling committee. However, during the month preceding the start of the year, schedules are thoroughly reviewed with the aim of having all up-to-date at the beginning of the year. It is on these schedules that the branches and factories base the profit budgets described in the next section of this paper.

Scheduling for a company with numerous sales branches and factories is an important and time-consuming job. The scheduling committee at the home office and the general managers of the sales branches and factories must pay particular attention to this function. The employees chosen to assist in this work must be exceptionally well qualified.

Operating Budgets—Profit Budget

Complete budgets of sales, costs, expenses, and profit are prepared by the branches and factories at the beginning of the year and copies are sent to the home office. The sales and production volumes used in the profit budgets reflect, in each case, the approved sales branch and plant schedules previously referred to. (The scheduling committee reviews manufacturing schedules just before the start of the year in time for the data to be used locally to prepare the profit budget for the year.)

The branch budgets consist of two statements, profit statement and branch expense statement. The factory budgets consist of four statements, the profit statement and statements of shipping and general expenses, factory costs, and foundry costs. The accounts shown on these budgetary statements are, of course, the same as those shown on the accounting statements prepared at the end of each month. The cost and expense statements include both dollar amounts and unit costs. The budgets prepared for the home office are for the entire plant. Departmental budgets are handled by the local managements.

FACTORY MANAGER'S PROFIT BUDGET, YEAR 19

Financial Letter
Month Ended
Fiscal Year

	Column 1 Actual—Current Month	Column 2 Actual for 1st Mos.	Column 3 Current Forecast Budget for Remaining Mos.	Column 4 Current Forecast—Full Year	Column 5 Forecast Submitted Last Month	Column 6 Original Budget This Fiscal Year
SALES AT MOLINE DEALERS' PRICE:						
Whole Goods						
Repairs						
Total						
Tons Shipped:						
Including Inter-factory						
Including Inter-factory						
Tons Produced						
Income Statement:						
100 —Sales						
101 —Cost of Sales:						
a —Spec. Cost—Whole Goods						
a —Spec. Cost—Repairs						
Total Specification Cost						
b —Excess Overhead Expense						
c1—Excess Cost of Mat'ls Pur.						
c2—Excess Cost of Castgs. Prod.						
c3—Excess Cost—Pur. Castgs.						
c4—Excess Cost—Raw Steel						
d —Inventory Obsolescence						
e —Royalties on Goods Sold						
g —Profit on Int.-Fact. Purc.						
Total						
102 —Credits to Cost of Sales						
a —Discounts on Purchases						
c —Proceeds from Disp'l of Scrap						
d —Profit on Int.-Factory Sales						
h —Income from Royalties						
k —Inventory Adjustment						
z —Export Boxing Profit						
Total Credits						
Cost of Sales						
% Cost of Sales to MDP						
Gross Profit on Sales						
Deduct:						
162 —Expenses (Exhibit D)						
166a —Cash Discount on Sales						
166d —Uncollectible Accounts						
166e —Prov. for Ret. and Allow.						
Total Deductions						
Net Profit on Sales						
Other Income Less Income Charges						
Net Income Before Income Taxes						
166 —Provision for Income Taxes						
c1—Federal						
c2—State						
Total Income Tax Prov.						
Net Income After Taxes						

EXHIBIT 2

The sales branches usually do not furnish the home office budgetary data beyond the budgets submitted at the beginning of the year. Their expenses consist mainly of shipping and warehousing expenses, which vary with volume, and selling and general expenses, which are highly fixed. During the year, the home office usually can predict the sales branch expenses with a high degree of accuracy, even if there are increases or decreases in budgeted volume. Changes in estimated sales volume are handled through the scheduling committee.

The factories submit budgetary data to the home office each month in a financial letter. One page of this letter is devoted to the Factory Managers Profit Budget (Exhibit 2). In establishing this form we had in mind the need of the home office, not for the deviations from budget in the elapsed portion of the year but rather the expected (or known) deviations from the budget for

the entire year. As may be noted from Exhibit 2, the profit budget in the monthly financial letter is simply a profit statement showing operating data for the current month and elapsed portion of the year, the budget for the remaining months of the year, the current forecast for the full year, the current forecast prepared in the preceding month, and the original budget for the year. The home office usually does not ask the factories for revised expense budgets during the year nor does it ask for comparisons of budgeted and actual expenses. As mentioned previously, the factories operate departmental budgets and prepare other budgetary data to aid in controlling their own operations.

Because monthly reports which the factories prepare for the home office always include a profit budget for the fiscal year, regardless of how many months have elapsed, we believe that attention is properly focused on company goals for the fiscal year. We do not think it worthwhile to operate a profit budget in which the twelve month period ahead is budgeted by adding and deducting a month's budget each time a month elapses. As mentioned previously, the first manufacturing schedules for a fiscal year are made five months in advance of the year. The home office determines the selling price and standard cost of all items on these schedules and from this data a preliminary budget is prepared. Thus, preliminary budgets for a coming year are available about five months in advance of the year.

The information in Columns 3 and 4 of Exhibit 2 is what the home office needs and must have in order to prepare reliable budgets for the company as a whole as the year progresses. The managers of the plants are asked to keep in mind the fact that Column 4 must be their best estimate of what their final profit statement for the year will look like. In order to do this, the factories must examine their deviations from the budget during the elapsed portion of the year and must try to foresee deviations for the remainder of the year.

What We Prepare from the Information

Consolidated budgetary data is prepared by the home office and is based mainly on the previously described data furnished by the factories and branches. The following information is prepared regularly in the home office:

At the Beginning of the Year

1. Profit budget by months.
2. Balance sheet budget by months.
3. Cash budget by months.
4. Working capital budget by months.

At the End of Each Month

1. A budgeted and actual profit statement.
2. A revised profit budget for the entire year, which takes into consideration the original budget plus or minus deviations which have occurred during the elapsed portion of the year and deviations which are indicated during the remaining part of the year.
3. A budgeted and actual balance sheet and statement of cash and working capital.
4. Explanations and special data which may be necessary in connection with the above statements.

Performance Budgeting in Municipal Governments

by A. WINSTON SYKES

Budget Officer, City of Norfolk, Va.

The present author contends that budgets and standard costs for control are fully applicable to municipalities and suggests that the time has come when municipal authorities are likely to be receptive to public insistence upon the type of "money's worth" operations which they imply. In this article the setup of a municipal budget bureau is outlined and the application of standards is illustrated through the example of the street cleaning function.

FINANCIAL BUDGETS WERE EMPLOYED by governmental units many years before they were tried and instituted as a means of financial guidance in business. As was the case with many customs and business practices, certain segments of our jurisprudence, and some governmental policies and practices, the idea of governmental budgeting in our nation originally stemmed from budgetary practices followed in England. The governmental financial budget was originally prepared, not so much as an instrument for the control of the financial affairs of the governmental unit, as it was for justifying to the citizens the raising and levying of certain forms of taxes, licenses, and other imposts to provide funds necessary for the operation of the governmental functions during a certain period of time. That period of time is now generally referred to as the fiscal or budget year.

The Past of Budgeting in Business and Government—

Since emphasis was not directed to the vast utility the governmental budget possessed for effectuating economies and promotion of efficient operations, the sundry governments of our nation contributed little toward its development as we know it today in business. Modern budgetary practices are the product of the ingenuity of American business management. Some many years ago, the foresighted and deep-thinking businessman found that, as his business grew in size, some system of financial planning and control was a prime necessity to preserve the capital investment and to afford the optimum return on that investment. The governmental budget, with certain modifications and elaborations, served as a point of departure. It was accepted as a means of providing a financial course to follow, as well as the means of providing a benchmark for checking progress being made in attaining the projected budget plan. Hence, first forms of business budgeting were of the so-called fixed-type budget, the

same form originally created and used by governmental units. That type of budgeting is still found rather frequently in business today, affording satisfactory results under certain prescribed conditions. Some time prior to the commencing of a new fiscal year, estimates of sales, production, and operational costs are established as being what the business can expect to achieve. The one great weakness of the fixed-type budget is that it does not take into consideration the important element of volume variation in business operations.

To meet this situation, the flexible or variable budget was introduced by business management. This sets forth what the cost elements of business should be at varying levels of business activity. The primary merit of the variable budget is that it makes possible a closer and more reliable comparison of actual business costs for a given operating period, to a budget set or adjustable in accordance with the volume of business experienced.

During all these years of development, while the budget device was used by business to good and profitable advantage, governmental budgeting made little recognizable progress. Several reasons have been given for the inertia on the part of governments in this respect. First, the element of competition and profit did not exist in government, so control of expenditures to provide for more favorable competitive position and greater profit attainment could not serve as a motive to government to improve budgetary practices and procedures. Second, government was composed of quite a number of officials in financial capacities who were not sufficiently qualified in accounting and management practices. Third, political groups, in some instances, did not wish to have too much control over governmental spending, else political objectives and patronage would suffer. Fourth, citizens had failed to bring sufficient pressure upon political groups for governmental economy and efficiency.

Present Government Practice; Emergence of Performance Budgets

Most local governments employ one of two budgetary plans interchangeably. Prior to election years, governmental officials may fear that tax rate increases and/or the introduction of new forms of taxation might impair their chances of continuing in office. Under this reasoning, it is not unusual to find the chief executive making known to departmental executives that revenues from present sources at existing rates will produce only so many dollars in revenue during the new budget year and that departmental expenditure appropriations, in the aggregate, must not exceed the revenue forecast. Where elections are not to be held during the forthcoming budget year, we frequently find tax rate increases and/or new forms of taxation passed by governmental legislative bodies.

The departmental executives, in setting their appropriation requirements,

most frequently base their expenditure requests on the trend of expenditures over the past several years, adding margins to meet prevailing and anticipated changes in the economic pattern and further adding some "cushion" to make sure that plenty of funds will be left, even after some reduction is made by either the chief executive or legislative body. The expenditure trends of a municipal department is no criterion on which to base the need for future expenditure appropriations, for it is elementary knowledge that such expenditures of past years can and do embrace some waste and inefficiency. That, in itself, should indicate the unreliability of using past expenditures as a basis for establishing future appropriation amounts. Manifestly, budgeting along these lines is far removed from the scientific treatment it finds in the better-operated and managed business concerns. One cannot but understand just why governmental costs rise from year to year, bringing on the need for increased tax burdens to be borne by the citizens.

What has been related may be considered the usual present-day pattern followed in governmental budgeting at the local and other levels. Of course, there are some cities which have conscientious management and fairly acceptable budgetary control programs. Even so, it cannot be said that budgeting as found in the average American city has achieved the degree of perfection that is still possible.

In some few local governments, operating under the city manager plan, pioneering work has been under way for some time in transforming governmental budgets over to what are technically styled as "performance budgets". This new term should not be accepted to connote something new in the general knowledge of budgetary practice now existing. Just as business management some years ago decided that governmental budgets, with some changes and development, could be adapted to serve definite purposes and goals in business operations, officials of progressive local governments obviously see that the highly-improved business budget has a positive and valuable use for forecasting and controlling governmental expenditures.

The principle followed in performance budgeting by local governments adheres precisely to the general principle observed by progressive business concerns in setting their budgets. That principle is:

> After determining the number of units of each function that are expected to be performed during the forthcoming budget year, multiply the quantitative factor by the standard unit functional cast.

In that way, a scientific approach is made toward the establishment of the individual budget expenditure appropriations. Moreover, from the budgetary control aspect, where standards are employed in government, actual periodic

costs with comparable standard costs can be reported statistically to indicate variances from anticipated performance. Variances can then be localized to specific areas of operation and their causes brought to the surface. At that time, governmental management is placed in a position through which corrective action can be instituted to avoid a recurrence of unfavorable or substandard performance. Directness in correcting a bad situation is the prime product of such governmental budgetary procedures. Guesswork is also removed from the operation of setting budgetary appropriation amounts.

Objections Raised to Performance Budgeting for Governments

With the introduction of this modern concept of governmental budgeting, a great number of municipal executives immediately went on record by saying that performance budgeting was too involved and costly. Many will recall that the same two objections were advanced by business management during the infancy of cost accounting but, as time passed, the values emanating from the well-devised cost accounting system were fully recognized by business management to the end that the cost accounting section, division, or department was established as an indispensable essential and source of facts and figures necessary for the intelligent management of the affairs of the business venture. The author contends it is unfair to judge the merits of performance budgeting and its counterpart, municipal cost accounting technique, before affording both a fair trial in government.

Some administrative officers of local governments hold that performance budgeting limits the flexibility of action and accomplishment on the part of operating executives. The author feels that the argument that performance budgeting is not flexible is a weak one indeed, as able accountants and managers in business have been able to devise cost systems and other accounting media to cope with the sudden changes and problems which have arisen over the years in the business world. The efficiency and strength of any organization, whether it be a profit-making undertaking or a constituted government, is judged by its ability to cope with changes as changes occur. The phenomenon of change has been the rule rather than the exception since the economic depression of the 1930's.

A simple illustration may indicate how a budget can easily cope with changes. In a city not frequented by snow storms as a usual occurrence, a severe storm may visit the municipality, hindering the movement of traffic and business, adding perils to public safety, and generally affecting community life for hours or days thereafter. It may be that no provision has been specifically made

in the operating budget for the eventuality, but through carrying a reserve for appropriations for contingencies in the operating budget, funds can be transferred from the reserve account in the budget to the division of street cleaning in the department of public works to finance the removal of the unanticipated snowfall.

Then, there are other municipal officials whose objection to performance budgeting rests on the oft-quoted statement that, while performance budgeting and cost accounting are employable in business, governmental activities differ from business, and consequently, these two mediums are limited as to application in governmental operations. This group contends further that a common denominator or unit of measurement is not readily determinable in a majority of municipal functions, and that this condition precludes the use of such budgeting practices and cost accounting techniques. To these arguments, the author replies that anyone familiar with the various elements embracing a general governmental operation or function will have no difficulty in establishing a common measuring unit for work accomplishment in government.

Organization and Functions of a Municipal Bureau of Budget

As to physical location, the bureau of budget should be contiguous to the office of the city auditor or office in which the general financial records of the municipality are maintained. To provide the optimum in directness and efficiency, such a location is requisite, particularly where interlocking cost records require reconciliation with the general accounts of the governmental unit.

The bureau of budget should be headed by the budget officer who in rank and compensation, should be on the same level as departmental heads, because of the importance of his functions his dealings with departmental executives in discharge of it. Rounding out the organization would be an assistant budget officer, accountants versed in municipal accountancy, statistical typists, and stenographic help. The cost system should be supervised by a chief cost accountant, while several cost clerks are appropriately assigned to operating the system of cost accounts.

The prime responsibility of the bureau of budget is to prepare the tentative operating budget of the municipality. Secondarily, the bureau is charged with the execution of the budget as adopted, controlling expenditures within the framework of that document. In this respect, monthly reports on accomplishment and spending should be prepared to indicate actual versus standard performance and cost, variances denoted. All variances should be investigated for their causative factor, which should be made known to proper officials,

along with recommendations for remedial action. Collateral to these two important functions, the cost accounting function should be performed by the bureau of budget, since budgets prepared on the performance budgeting principle require the use of unit and other costs accumulated through the system of cost control.

Much is to be gained by placing the cost accounting for capital projects, as well as for operations, in the bureau of budget. Individual job cost records should be maintained for each project authorized and undertaken, such as new streets, roadways, sidewalks, curbs and gutters, and water line installations. The cost of materials, labor, supervision, general overhead, and equipment rental and use should be recorded specifically on each individual job as employed. In the case of street construction, work elements or operations might embrace surveying and engineering, general supervision, grading and filling primary road bedding, surfacing, and some other operations in which the various elements of cost already mentioned would be classified and recorded by specific work operations. Then unit costs of each such operation peculiar to the job would be available for use in connection with providing estimates of similar future work. Also, trend analyses would be available to indicate whether construction costs were increasing or declining on certain types of work. Greater accuracy would also be afforded in setting the amounts of capital improvement appropriations, eliminating in many cases the necessity of obtaining additional councilmanic appropriations to complete the project.

In addition, the cost accounting section should be responsible for the maintenance of cost records on operations of municipal hospitals, alms houses, prison farms, jails, and other institutions, as well as for such working capital fund operations as governmental print shops, garages, asphalt plants, and the like. Cost accounting should be maintained for municipally-operated utilities, such as water supply systems, gas and electrical works, and transportation systems. When public utilities do not form a part of the general governmental organization, but are operated through boards or commissions, cost accounting for those operations should then not be incorporated in the bureau of budget but should be handled through the accounting office of the utility.

At some time, under performance budgeting, a methods and systems section could be created within the bureau of budget. The duty of that section would be directed to assisting in the accomplishment work tasks in the best attainable manner with the least cost, and giving assistance also in the setting of standards. Devotion of effort in this direction would enhance the efficiency of a governmental unit and definitely reduce costs in many areas.

Standard Costs for Municipal Operations

Budget appropriations under the performance budgetary principle are established by multiplying the number of units of each function anticipated to be performed during the ensuing budget year by the standard unit cost of that function. This means that each municipal function must be previously studied, broken down into subfunctions, and costs related to each subfunction. Normally, the standard cost elements of each function of subfunction would follow the budget classification, since it is elementary knowledge that the budget and accounting systems should be uniform to permit comparisons without resort to adjustments and reconciliations. That being so, the standard cost for the performance of each unit of work would obtain the following elements of cost:

Personal services
Materials and supplies
Repairs
General operation
Equipment (Depreciation)

An Example: Standard Costs for the Street Cleaning Function

Taking the division of street cleaning and refuse collection in a department of public works, we find the principal functions or subfunctions are: hand sweeping, machine sweeping and flushing, refuse collection, refuse disposal, and (sometimes) snow removal. These constitute the major functions of the particular municipal operating division and costs would be accumulated in cost accounts along lines much the same as for cost center or operational cost accounting in the manufacturing enterprise. If the indicated pattern of cost-keeping is to be followed for street cleaning functions, it becomes evident that standard unit costs to perform each of those functions must be established. Before that can be accomplished, it becomes necessary to set the work unit for each of these functions.

In the case of hand and machine sweeping, the unit would be curb-miles. In the case of refuse collection and disposal and of snow removal it would be cubic yards. Thus, unit standard costs would then be determined for each of these four or five functions, along the same lines as illustrated in Exhibit 1 for the hand sweeping and machine sweeping operations.

During the first year in which standard costs are set and employed, it may become evident during operations that the standards are subject to some inaccuracy. This is to be expected at times, as most municipalities will, for the lack of past performance records and in haste in setting the original standards, err

in some instances. Nevertheless, as these irregularities are brought to light, standards should be adjusted. While some municipalities do not grant wage increases during a budget year, others do. If the latter policy is followed, then standard costs must be revised to reflect increased wage rates of laborers and supervisory help, as current rather than basic standards are preferred when standard costs are employed in municipal operations. That is because standards set on the current basis lend themselves more readily to formulating budgetary appropriation amounts.

In setting the original standards, spot studies may have to be employed where past performance records are lacking, to indicate how many curb-miles a laborer can perform in the hand sweeping operation or how many curb-miles a machine operator can travel per hour a day. Whether or not this is necessary in the first instance, periodic time studies should be made to evaluate the reliability of standards.

Estimates will have to be made as to the cost of brooms for hand sweeping, uniforms for such employees, and other material and supply elements allocable to the curb-mile of measurement, in setting standard costs for materials and supplies consumed in the hand sweeping operation. Repairs and general operational expenditures may be either direct or indirect. Gasoline, oil, and lubrication supplies, as well as repairs to machine sweepers, would constitute direct charges to the machine sweeping operation. Timekeeping costs, as an indirect element, are distributed to the four or five functions of the street cleaning operation on the basis of number of employees assigned to each function, while supervisory costs are allocated on the basis of time devoted to each of the functions. No great difficulty is usually encountered in determining the basis for proration of general overhead items.

It will be noted in Exhibit 1 that standard costs are indicated before inclusion of the depreciation element as well as following its inclusion. As municipal accounting and budgetary practices do not take into account the element of depreciation, except where assets are devoted to public utility and working capital funds operations like print shops, garages, and asphalt plants, the standard cost before depreciation inclusion must be determined to permit comparisons with the operating budget and general accounts of the city, which do not ordinarily reflect depreciation charges.

In a fashion similar to what has been related for setting standards for the hand and machine sweeping operations, standards are established for the refuse collection, refuse disposal, and snow removal functions, to round out the standard cost accounting for the division of street cleaning and refuse disposal.

Exercising Control Under Performance Budgeting

Periodically, usually monthly, reports are prepared to indicate the actual and standard costs of operations, broken down by budget groups, i. e., personal services, materials and supplies, repairs, and general operation. In the case of machine sweeping operations, mileage records at the start and close of each day's operations are rendered by the machine operator and forwarded to the cost accounting section. Supervisors of hand sweepers ordinarily prepare the report of curb-miles swept, by hand sweepers. Routes are usually defined and cruised by automobile by the supervisor to ascertain the number of curb-miles contained in each route. Reference to route mileage charts for the various routes or areas worked by hand sweepers, provide data for reporting curb-miles swept daily.

SWEEPING OPERATIONS

	HAND SWEEPING	MACHINE SWEEPING
Unit of measurement	Curb-mile	Curb-mile
Standard cost elements:		
Personal services:		
1 Laborer at 85¢ per hour x time required to sweep 1 curb-mile	xx	
1 Machine Equipment Operator at $1.10 per hour x time required to sweep 1 curb-mile		xx
Materials and supplies	xx	xx
Repairs	xx	xx
General operation (Overhead)	xx	xx
Standard cost, excluding depreciation element	xx	xx
Depreciation of plant and equipment	xx	xx
Standard cost, including depreciation element	xx	xx

EXHIBIT 1

The cubic content of vehicles employed for refuse collection is known, so that the cubic yards collected daily is established by multiplying the number of loads by the cubic content of the truck. In a similar manner, the incinerator foreman reports daily the number of cubic yards burned at the incinerator.

From these daily performance reports, the number of work units accomplished during the accounting period is multiplied by the standard cost to arrive at the aggregate standard cost for each function, for comparison with actual operational costs. Variances are drawn off by budgetary group classification and segregated into price, efficiency, and volume variances to indicate unsatisfactory as well as satisfactory performance. Through this medium, unfavorable variances signal, as on a gauge panel, off-standard and costly performances for investigation to disclose just what actually contributed to their occurrence. With the

facts at hand and using a minimum of time and effort, positive and intelligent action can be directed to avoiding repetitions of adverse performance.

Intimate knowledge of standard cost applications in business endeavors, will permit the same principles to be applied to governmental operations by an individual of initiative desirous of extricating government from the rut of unwise expenditure of tax monies. For instance, a central filing bureau at the local governmental level can be controlled to an amazing extent by means of setting work standards and the maintenance of control under standard costs. File clerks, with little inconvenience and delay in productive effort, can maintain the number of pieces of mail classified and the number of pieces of correspondence filed or referred to in the course of a day's work. Unit costs may be set up for such units-of-performance measurement and can be related to the annual budget appropriation requested by the filing section, to determine to what degree the request is reasonable.

Performance Audits Symptomatic of Changing Attitudes

Performance audits for governmental units have been receiving attention in some governmental circles quite recently. The Hoover report suggesting economies at the Federal level, has laid special emphasis on the value of such performance audits. The State of Virginia is entering the final phases of a complete governmental reorganization for the promotion of both economy and efficiency. Presently, the State of Michigan is moving in the same direction. Likewise, the City of Richmond, Va., deserves considerable recognition for its courage in instituting the performance budget a year or so ago.

While management audits in business review all operations, (not only financial transactions), and look forward to the means by which operations can be improved, governmental management audits are employed with the hope of making operations more efficient. Although the scope of governmental management audits are somewhat limited, as compared with those of business enterprises, it is encouraging to know that some of our governmental units are uneasy about the manner in which they function. A consultant, in reporting to the State Government of Michigan, emphasized that clearly-described programs should be formulated to justify operational appropriations for its various functions. His statement imparts what is meant by performance budgeting. Under this budgetary procedure, the work load is established first and the cost of performing that work schedule determined finally. That, as can well be observed, is a more sensible approach than the customary practice of appropriating so many dollars for a given function and later learning what that appropriation did afford in work accomplishment.

The Taxpayer Is Girding for Action

The man in the street synomonyizes government with inefficiency. His dealings with officials in government have glaringly brought to his attention the incalculable volume of red tape, duplication of effort, poor planning, lack of simplicity and directness, as well as the general overstaffing of personnel. His viewpoints are justified. While the attitude of the average taxpayer has in the past been more or less passive complaint, it has changed to a point where he is demanding remedial action, realizing that the present tax load and the higher one promised for the future are certain to make inroads into his standard of living and the possibility of saving a modest part of his earnings. It has been said by many that the tax load has just about attained what might be described as the confiscatory level, or saturation point.

These attitudes of the taxpayer are being regarded with a degree of seriousness on the part of some governmental functionaries, who are commencing to realize that the taxpayer's dollar should be spent to conform to the principle of rendering governmental service at the least attainable cost. From a personal and more selfish viewpoint, the governmental official is beginning to understand that if economies are not undertaken by him to relieve the heavy tax burden, someone else may soon be occupying his office. Accordingly, the subject of performance budgeting is being lent a more attentive ear by some public official, for the reason that one of the best conceived means of eliminating criticism of unbridled governmental spending is through the medium of scientific performance budgeting, fortified by an adequate system of municipal cost accounting control. The time has now arrived for constructive steps along these lines if the high standard of living of our citizens is to be preserved and the system of free enterprise continued and secured.

A Contribution from the Industrial Field

Fundamentally, performance budgeting is merely an extension and adaptation of industrial accounting and budgetary technique to the functions and operations of government, providing the same well-known device as has been utilized by industry for many years for measuring and evaluating both performance and cost. In this respect, the great advance of industrial accounting and its counterpart sciences has made an inestimable contribution to the field of governmental management, by making available scientific means of judging the efficiency and acceptability of policies and procedures as they relate to governmental functions and their cost.

THE WORKSHOP

A Materials Conservation Program

by ARTHUR P. ROFFEE, JR.

Chief Cost Accountant, Providence Base Works, General Electric Co., Providence, R. I.

IT IS DOUBTFUL if any of us expected to be confronted again with the situation which existed a few years ago with respect to available supplies of raw materials. Yet it has come once more in an increasingly tangible form. Management of almost every type of industry has been or will soon be affected to some extent by the M-orders which have been issued by the National Production Authority. Employment is high but, from time to time, news items announce plant-wide "lay offs" due to the inability to secure raw materials. The return to a controlled materials plan for items containing steel, copper and aluminum is now five months old and management is investigating all programs which will alleviate the situation.

Although the time to plan is before the pressure is applied, the wise viewpoint now is, "Better late than never". In this article there is described an organization and a program which has proved very successful in the conservation and salvaging of needed materials. To be successful, any program of this type must have the backing of top management. It must be headed and supervised by a man or a committee factory-trained and knowing the practical problems involved in the manufacturing process. It also needs to have, not only the indorsement of management, but its active support as well. The department heads must know that materials conservation is important and that they must enlist the support of every employee. If each realizes that the program may mean the difference between a temporary shutdown for lack of materials and a steady job, the cooperation and the results will be greatly improved.

A Four-Part Plan

Our management announced its desire to sponsor the program and selected the chief cost accountant to organize and to supervise it. As personnel of the committee, the assistant foreman was named to represent each department. There were several reasons for this choice. These men are practical men. They have been promoted from the ranks. They are close to the problems to be encountered. They have the authority to issue in-

structions. They are aggressive and anxious to make a showing. It was decided not to hold full committee meetings, ordinarily, but that the chairman and the departmental representative should meet to discuss and to lay plans affecting the department. In order to coordinate efforts and work toward a common goal, it was decided to deal with materials activities under the following headings:

1. Accumulation
2. Disposal
3. Conservation
4. Substitution

The chairman was made responsible for studying all government orders affecting the materials used by the organization. This included perusing technical magazines and papers in order to keep abreast of existing conditions in the scrap markets. A knowledge of the requirements of industries within a reasonable distance of a plant's location will sometimes make it possible to secure strategic items or to dispose of surplus items in inventory.

Accumulation of In-Plant Materials

The first assignment was accumulation. A tour was made of each department and all material, on the benches, under the benches, and in many other hiding places were returned to the stock rooms. In any plant, there will be surprise at the amount of maintenance materials which will turn up as the result of house cleaning! A close study was made of the items in the inventory to determine inactive items, excessive balances, etc. Several lists were printed itemizing the inactive stock items.

Considered Disposal of Surplus Items

Disposal was next considered. In the case of finished stock, former customers were contacted to determine whether or not they could use the material under discussion. Raw material accumulations were listed and the lists given to the manufacturing heads and the purchasing department in order to keep before their attention that certain materials were available. These lists were carefully analyzed and many of the items were used as substitutes, eliminating the necessity of purchasing new material. Producers and distributors of some of our excessive inventory items were notified of available quantities. This helped to dispose of some of our items and also helped other concerns to secure items they needed badly.

The amount of idle equipment stored at various places throughout the plant is another source of surprise. This was true in our case. Much of this equipment was fully depreciated and would never be used again. It had been put away in a storage room and all that was needed was a decision on the part of the head of the manufacturing department and the head of the engineering department that it would no longer be needed

for production. Steps were then taken to dispose of it.

Scrap prices are at their highest and this is the time to dispose of anything not needed. All of the mills need scrap to produce new metal for industry. However, we found it a point to watch the composition of scrap and not to mix different alloys and different kinds of metal. The monetary allowance received is based on the lowest priced metal in the lot. Also a segregation charge may be involved. Likewise some of the present government regulations require that scrap be kept separate by kind and alloy.

A Few Avenues of Direct Conservation

Conservation was our third task. There are almost limitless possibilities for accomplishment and the progress made depends on the vision and enthusiasm shown by the organization.

There is a point at which materials conservation dovetails with conservation of labor. Strictly labor conservation matters are perhaps outside of our subject, but rearrangement of equipment so that an operator can run more machinery without requiring much more exertion, use of die sets in high speed presses to increase the hourly output of a worker, conveyorizing of plant through mechanical means or the use of compressed air tubes to reduce handling and transportation charges, and elimination of many hand operations by substituting mechanical or automatic equipment may deserve mention here. Another means of labor conservation, closer to materials conservation is to improve the quality of product in order to reduce inspection costs to a minimum. Quality control is something we have heard much about lately and many companies have found it a profitable part of their program. In a metal plant, use of double-cut machines rather than single-cut will reduce the number of operators necessary.

Avoiding scrap at the source is definitely a factor in both materials and labor conservation. By preventing the spoilage of work we have largely avoided the necessity of a salvage program with respect to process materials. A fertile field to promote conservation of labor and materials has been found to be through proper training of new employees. Intelligent operation keeps to a minimum material losses and machine breakdowns which result in lost production and high maintenance.

Maintenance is, in itself, a conservation program. Illustrative of practical steps taken have been electrolizing taps and dies to reduce wear, treatment of castings to overcome blow holes and avoid useless scrapping, and chrome plating punches and similar tools to increase tool life. The adoption of these ideas has, not only conserved material, but has also reduced machine down time and increased employee efficiency.

Our tool procedure was revised to prescribe return of all worn tools to the tool crib for analysis as to causes. Worn surfaces in many cases represent a small area of a punch, die, cam or other part. We formerly discarded the worn tool and replaced it with a new one. Research revealed that a sleeve or ring could be made to attach to punches and replaced when worn. The major portion and the most costly part of the tools was still as good as new. On large dies, an insert was made which followed the same principle. Carboloy, a tungsten product, was used to line many of our dies and this increased the die life and productive output by an appreciable percentage.

One of the major difficulties now encountered is the inability to secure necessary supplies. We found that, by recutting files, the inventory of this item may be stretched out. The average mechanic does not like a reconditioned tool but it fills the bill and is certainly better than doing without. Again we have been able to save tons of sawdust each year as the result of redrying it. Silver nitrate and other chemicals collect in the bottom of tanks in the form of sediments. Sending these to a refinery results in a reduction of material consumption costs. Tons of acid were saved by reducing the lustre on the finish of the product. The appearance only was affected, not the quality.

There are general suggestions which can be made. Motorizing equipment greatly reduces the cost of leather belting. In large and older machine shops, this is quite an item. Also automobile concerns and many other metal users are conserving tons of metal through the use of thinner gauges.

Opportunities in Materials Substitution

Substitution of materials gives management an opportunity to test the vision of the executive and engineering staffs. Many observers were surprised at the materials substitutions effectively used during the last war as the result of necessity. Here are a few things that have been accomplished (utilizing the experience not only of our own company but of others):

1. **Aluminum for brass.** Aluminum is said to be the most abundant metal on the earth. Production facilities are being expanded at a rapid pace and the supply should be available. Aluminum weighs only one-third as much as brass. Assuming the same thickness, the same number of pounds will make three times as much output. With the metal prices of today, a cost saving results because of the lighter weight of the metal.
2. **Plastic for brass or aluminum.** If is true that plastic material is difficult to get at present but it offers an opportunity when the supply situation improves.
3. **Cardboard containers to replace wooden barrels and boxes**—In this direction there are two opportunities, one through the substitution of material and the other through a reduction in transportation cost because of the reduction in weight. Rising transportation costs make this an item worth considering.
4. **Brass plated steel**—This is a suitable substitute for some metals. It is more difficult to process and certainly increases the maintenance cost consid-

erably but there are times when the important thing is to produce and to keep the factory in operation.

We have found that it is desirable to try to avoid the thought that a plant is different and that there are few opportunities for results. If this thought is allowed to enter, it may prevent or limit accomplishment. The results which an alert and interested group can accomplish are surprising.

Something To Work At

The materials conservation program has not run by itself in our company. It means a lot of effort on the part of the chairman. Constant contact is kept with each department representative and a lot of encouragement is necessary in order not to let the program bog down. It is necessary to inject new ideas constantly to keep committee members and others alert to the importance and the value of their accomplishment. As a conclusion, it may serve to broaden the picture here presented, to review some of the things that a successful conservation program can do for any organization:

1. **Purchasing**—Economy may be realized through a constant check on the quality of the material received to assure no loss of labor on inferior materials and also to expedite return for credit of material not of good quality. Reduced purchasing of materials already in the plant should result. Under this heading, a record of all motors and small tools on hand, classified as active and inactive, will avoid purchasing items already available but in storage.

2. **Manufacturing**—Through constant stress on quality and control of defective work, more efficient use of materials will be achieved. The mental attitude of the employee means a lot in a program of this type.

3. **Sales**—The conservation program includes calling attention to inactive items which the customer may be pleased to get under the present unusual conditions and which may help him to keep his plant in operation.

4. **Financial**—Converting inactive materials into cash, selling obsolete machinery for scrap prices or to a company which can use it, keeping inventories at a minimum and, last but not least, reduction in costs brought about by improved methods—all these are reasonably to be expected from materials conservation efforts properly administered.

Watching the Defense Contract Backlog

by E. H. COUGHRAN

General Accountant and Statistician, Cannon Electric Co., Los Angeles, Calif.

DURING THE PRESENT PERIOD of continually expanding and often unpredictable requirements on the part of governmental agencies, it is incumbent upon all manufacturers dependent in whole or in part on defense business, to know at all times the relation of the total inventory and purchase commitments to the unfilled orders on hand. Bearing in mind the ever-present possibility that a favorable change in world conditions could result in wholesale contract and subcontract terminations, the eventuality of disastrous over-production in some lines contrasted with critical shortages in others

suggests that there is an *apparently* comfortable over-all current picture which we must guard against taking too much stock in. It is necessary to be assured at all times that the relief granted by the contract termination process is going to afford the maximum possible protection.

The Case of Diverse Products and Operations

The obtaining of this assurance can become complex when the nature of the product and the type of prime and subcontracts held, tend to result in a large volume of small orders, frequent change orders and outright terminations due directly and indirectly to revised end-use requirements. The problem is apt to be further complicated if the manufacturer is attempting to constantly survey a large number of product groups or lines aggregating several thousand individual products where each, in turn, contains numerous component parts which may be, to some extent, interchangeable between products and/or product lines. In such a case, it frequently becomes necessary to produce and make commitments for raw materials and subcontracting, based on the over-all requirements for interchangeable parts.

Confusion really reigns supreme when all of the aforementioned conditions are present and the nature and value of the various products are such that the multitude of individual operations required to produce the component parts and assemble the end-products is so detailed, each being a minute portion of the whole, that the expense inherent in any method approaching job cost control is prohibitive.

Correlating Inventory, Commitments and Backlogs

The only logical approach to this and similar problems is that of "divide and conquer." At the same time, it is more practical to control groups of products rather than to attempt to produce voluminous schedules covering individual products. Most companies already analyze their backlog in a manner consistent with analysis of sales. Most, where standard costs are available, analyze cost of sales on a comparable basis. Likewise, a great many carry inventories of finished goods and component parts under the same general product classifications as sales, or at least can make such an analysis available on a continuous basis. No production or inventory control unit can long justify requisitions for raw material, subcontracted parts, or production orders which are not in some manner based on the products to be reflected eventually in the reduction of the backlog on a first-in-first-out basis. No purchasing agent can long continue to justify commitments which are not in accord with the requisitions received, even to take advantage of market conditions.

With all of these considerations

kept in mind, the making of inventory and purchase commitment comparisons with the backlog shows itself to be mandatory practice. Adhering to the divisions of the product line which have been proven natural or expedient from the standpoint of sales analysis, it is desirable to measure the backlog, the inventory, and the outstanding commitments in a manner which produces a wealth of highly valuable information.

Classification of Data

The first step, if not already taken, is to reduce the backlog to the sales product line classification and to adopt measures which will provide for continous classifications of all incoming orders, cancellations, changes, and outgoing shipments. A historical compilation of the standard cost of sales in each product line, developing the percentage of the standard cost by lines to the net sales by lines, will be sufficiently accurate for use in determining the estimated standard cost contained in the backlog with, at most, some adjustments for known conditions not reflected in the historical standards.

After having obtained dependable measure of the standard cost in each product division of the backlog, it is in order to apply the same process to the inventory. It is difficult to conceive of an inventory containing numerous product lines in which at least the finished goods and the finished component parts are not already classified by lines. For present purposes the assumption is made that the step has already been taken. Work-in-process, assembly work-in-process, and raw material inventories may or may not be so classified. However, assuming that the production scheduling and purchasing functions have been fairly consistent with usage and/or backlog requirements, a logical basis for proration of these inventories can always be found if they are not already properly broken down.

There remains the treatment of obligations incurred as inventory purchase commitments. These are fully as important as the inventory on hand. It is not at all impossible for a manufacturer to have his house reasonably well in order insofar as his physical inventory is concerned and still be obligated for raw material and sub-contracted production to an extent that, when wholesale terminations take place, the combination of the two might be in excess of the total production his claims would support in some or all product lines. It behooves all to know what they are obligated for in relation to the backlog as well as how much the total obligation is.

The Schedule and Its Interpretation

All of the above data may be compiled in convenient form as regular support for periodic balance sheets and profit and loss statements. A suggested method of presentation with formulas

ALLOCATION OF INVENTORY AND COMMITMENTS
By Product Lines
Month of

ALLOCATION OF INVENTORY AND COMMITMENTS
By Product Lines

Month of .....

Product Line No.	Standard Cost Values: INVENTORY AND COMMITMENTS — Total Inventory Allocated	Purchase Commitments Allocated	Total to be Considered	Sales: Sales for Month	Backlog	Annual Turnover on Total	Months Required to Run Off Total	Backlog: % Covered by Total — Current Month	1st Prior Month	2nd Prior Month	Full Termination Protection — Yes	No
Typical Examples												
11	100,000	150,000	250,000	50,000	400,000	2.4	5.0	62.5	64.0	63.9	X	
12	200,000	400,000	600,000	50,000	400,000	1.0	12.0	150.0	155.0	157.0		X
Formulas	A	B	C	D	E	F	G	H	J	K	L	L
			(A + B)			12 × D / C	C / D	C / E	(Carried forward from previous reports)		Col. H 100% or Less	Col. H over 100%
Total												

Prepared by.....Date.....

EXHIBIT 1

and typical examples of results obtainable appears in Exhibit 1. Special mention should be made of the highly indicative measurements made possible by compiling all of the data discussed in convenient form.

The first measurement and perhaps the one most frequently used, is the annualized turn-over, obtained by expanding the standard cost of the sales for the period reported to a theoretical annual cost of sales and dividing that figure by the inventory and commitments at standard. This is exemplified in Column F of the Exhibit. Another unit of measurement which has merit, is the number of months required to run off all inventory and commitments at the established rate of sales. This is the result obtained by dividing the standard inventory and commitments by the standard cost of sales for the past month, or perhaps the average of the last three months. Column G of Exhibit 1 develops this information.

Measurements can be made of the backlog comparable to the two just mentioned, by substituting the standard cost of backlog figures for the standard cost of sales figures. However, it is probably more beneficial to state, by use of percentages, the portion of backlog which is covered by the combined inventory and commitments. When this is done and the percentages for at least the two preceding periods are carried forward for comparison, any significant trend is immediately brought into focus. An inspection of Columns H, J, and K will help here. An additional quick check on the relation of the backlog to the combined inventory and commitments is provided in the two columns at the extreme right of the form. A preliminary glance down these two columns immediately discloses the lines on which the backlog falls short of the provisions to make shipments. Those lines checked in the "No" column are those in which a 100 per cent termination could leave on hand an unmarketable inventory.

No Surprises

Use of the material described and illustrated in this paper makes available to management one more efficient tool for control by exception. It immediately becomes apparent when the first report is published, which product line or lines require special attention. Subsequent reports, in turn, measure the effectiveness of action already taken.

THE COST FORUM

A STUDENT'S VIEWS ON COMPANY TRAINING PLANS

Editor, N. A. C. A. Bulletin:

As an accounting student who graduated in June, 1951, I was particularly interested in the articles "Telephone Company Accountants Receive Operations Training," by J. W. Sistrunk and "On-The-Job Training After Two Years," by Calvin A. Vobroucek which appeared in the *N. A. C. A. Bulletins* of January and February 1951 respectively. My interest stems from the fact that the main difficulty I have had in the study of accounting has been, not the learning of any one phase or text book chapter, but rather in tying the various phases together in order to get an over-all picture and understanding of general procedure. This has been especially true in the study of cost accounting and, while practice problems are of definite value in bridging these gaps, their effectiveness is often limited unless the individual student is familiar with the processes or operations discussed in the problem.

It seems, then, that the first and foremost goal of the new accountant, if he is to be anything more than a keeper of records, is to become thoroughly familiar, not only with the accounting system in use by the company of his employ, but also with the factory operations from start to finish of the product. As Mr. Vobroucek suggests in his article, this knowledge may be gained by the individual either through experience alone or with the help of a training program. For the person starting with a small company, a little initiative and experience is probably all that is required to enable him to gain the knowledge he needs in a reasonable length of time but, in the case of a large company, the experience method is likely to be a slow and perhaps costly process, in that the newcomer may become so discouraged as to look for a different job or even a different field before he learns the answers to all his questions. The company, in turn, would have an employee who was working far below his ultimate capability and efficiency for an extended period of time and, if he left, would have the added cost of an increased labor turnover.

Having worked for a large company before entering college, I found that, to a certain point, asking questions of fellow employees is a satisfactory way of learning but that, after the initial employment period, the answers are given less freely, particularly if the question does not seem directly connected with the job on hand. It would appear, therefore, that, if the accountant is to fulfill his function as an aid to management, the most satisfactory, efficient and practical solution to the new employee problem is some sort of all-inclusive training program such as those described in the two articles cited.

RICHARD W. BETHKE, *Ithaca, N. Y.*

USE OF LOT SIZE VARIANCE FOR THE DYEING OPERATION

Editor, N. A. C. A. Bulletin:

Standard costs have been the generally accepted practice of cost accounting in the textile industry for many years. More and more, the textile service industries are refining their procedures to follow the pat-

tern of the integrated manufacturers. The dyers and finishers, printers, and throwsters have realized the advantages of standard operational and process costs, along with the flexible budgets and cost and variance control statements. In this letter, one element of cost will be discussed, which has always been a problem, not only to the dyeing and finishing department of the fabric manufacturer but to the commission finisher as well.

The standard cost of dyeing, whether it is tub, jig or any other method, is predicated on a normal size of dye lot. Experience determines what this should be. However, an analysis of the sizes of dye lots for a particular type of quality will reveal a very wide deviation from the average. This may be caused by a limited demand for certain colors, or small quantity orders by particular customers, thus causing some lots to be below normal size. Another situation, such as the repetition of standard shades occurring on several orders, may permit a merged lot of substantial volume causing the lot to be above normal size. The lot size variance account has become a very potent tool of cost control, as well as yielding dependable information for establishing price differentials.

The following example will illustrate the use of the lot size variance account in the control of direct labor cost. Let us assume that the qualities being costed are dyed fabrics in which the dyeing labor cost is on a pound basis, and that the following standards have been adopted:

Quality A—Standard lot 100 lbs.,
4 hrs. @ $1.00 per hour = $.04 per lb.

Quality B—Standard lot 24 lbs.,
4 hrs @ $1.00 per hour = $.166 per lb.

(It is conceivable that a normal work load per operator and hourly labor rate would be in excess of the conditions indicated above. However, the figures are hypothetical and for illustrative purposes only.)

If lots had been standard size, the standard recovery would have been:

A—3 Lots @	100 lbs. =	300 lbs. @ $.04	= $12
B—3 Lots @	24 lbs. =	72 lbs. @ $.166	= 12
			$24 Standard recovery
			18.56 Actual recovery
			$ 5.44 Lot size variance (Red)

The analysis of the variance becomes:

Lot size variance	$ 5.44	
Controllable variance	6.00	(Inefficient use of labor)
Total direct labor variance	$11.44	

It will be noticed from the above illustration that, by separating the effect of lot size from the total direct labor, the remaining labor variance reflects the efficiency of the labor utilized, thus placing responsibility where it belongs. If desirable, a further breakdown of the lot size variance can be made by qualities and even customers, so that one can determine the effect on the profits earned (if any, in some cases) of undesirable accounts.

H. V. W. SCOTT, *New York Chapter*

ACCELERATED AMORTIZATION UNDER CHANGING CONDITIONS

Editor, N.A.C.A. Bulletin:

THERE HAVE BEEN SEVERAL excellent articles on the subject of accelerated amortization which have noted that if basic conditions—such as tax rates, renegotiation, etc.—remain unchanged, there is no ultimate difference in the amount of profit retained or taxes paid by the contractor, whether or not he obtains a certificate of necessity and qualifies for accelerated amortization with respect to emergency facilities. Under such fixed conditions, the real advantage granted by the certificate are simply the quicker recovery of invested capital and the shortening of the period of risk of obsolescence.

However, what will happen if conditions do not remain unchanged? Suppose tax rates go up or down? Either of these developments could happen. If the emer-

EFFECT OF CHANGING TAX RATES ON ACCELERATED AMORTIZATION AND PROFITS AND TAXES

	Example 1 Tax rate unchanged for 10 years		Example 2 Tax rate lowered at end of five years		Example 3 Tax rate increased at end of five years	
	No Certificate of Necessity	Certificate of Necessity	No Certificate of Necessity	Certificate of Necessity	No Certificate of Necessity	Certificate of Necessity
1st Year						
Sales	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000
Cost of sales excluding depreciation	3,750,000	3,750,000	3,750,000	3,750,000	3,750,000	3,750,000
Depreciation	100,000	200,000	100,000	200,000	100,000	200,000
Gross profit	1,150,000	1,050,000	1,150,000	1,050,000	1,150,000	1,050,000
Expenses	600,000	600,000	600,000	600,000	600,000	600,000
Net profit before taxes	550,000	450,000	550,000	450,000	550,000	450,000
Taxes	258,500	211,500	258,500	211,500	258,500	211,500
Net profit after taxes	291,500	238,500	291,500	238,500	291,500	238,500
1st 5 Years						
Net profit before taxes	2,750,000	2,250,000	2,750,000	2,250,000	2,750,000	2,250,000
Taxes	1,292,500	1,057,500	1,292,500	1,057,500	1,292,500	1,057,500
Net profit after taxes	1,457,500	1,192,500	1,457,500	1,192,500	1,457,500	1,192,500
Last 5 Years						
Net profit before taxes	2,750,000	3,250,000	2,750,000	3,250,000	2,750,000	3,250,000
Taxes	1,292,500	1,527,500	1,100,000	1,300,000	1,515,000	1,787,500
Net profit after taxes	1,457,500	1,722,500	1,650,000	1,950,000	1,457,500	1,462,500
10 Year Totals						
Net profit before taxes	5,500,000	5,500,000	5,500,000	5,500,000	5,500,000	5,500,000
Taxes	2,585,000	2,585,000	2,392,500	2,357,500	2,807,500	2,807,500
Net profit after taxes	2,915,000	2,915,000	3,107,500	3,142,500	2,692,500	2,692,500

Assumptions

1 - Tax rate of 47%, changed to 40% or 55% at end of five years.
2 - 100% Certificate of Necessity, 5 year period, on $1,000,000 of machinery. Normal rate 10%.
3 - No renegotiation.
4 - Constant sales volume $5,000,000 of particular product involved; constant annual expenses $600,000.
5 - Machinery usable for 10 years.

EXHIBIT 1

gency lasts indefinitely, there is excellent prospect for pressure to pay more of its costs out of current income and hence pressure for higher taxes. If the emergency definitely ends, there will be pressure for curtailed armament expenditures and consequent pressure for reduced taxes.

If tax rates change upward after all or part of a facility has been amortized, the contractor would have been better off without the certificate, since his tax deductions were higher in the lower rate years. On the other hand, in the event of reduced taxes, he would have been better off with the certificate. If the admission of accelerated amortization keeps the taxpayer out of the excess profit tax area, there is a definite retained advantage in securing a certificate. All such suppositions, of course, are based on the facility having a longer useful life than that anticipated in the certificate. If the certificate reflects the

exact actual life of the machine, the disposition of it will tend to equalize the condition between certificate and no certificate.

What is the relationship between renegotiation and accelerated amortization? Again, if renegotiation is continued throughout the useful life of the facility and the profit picture on the items produced by its use remains unchanged, there is no ultimate difference in profits or taxes. But renegotiation may not continue as long as that. It ended with the emergency before and will probably do so again. And, since five years is the presumed period of emergency for accelerated amortization, it is quite possible that the holder of a certificate may find himself relieved of renegotiation within the same year in which his certificate expires. Assuming the al-

EFFECT OF DISCONTINUED RENEGOTIATION, OR ACCELERATED AMORTIZATION AND PROFITS AND TAXES

	Example 1 Under conditions of substantial profit		Example 2 Under conditions of medium profit		Example 3 Under conditions of minimum profit	
	No Certificate of Necessity	Certificate of Necessity	No Certificate of Necessity	Certificate of Necessity	No Certificate of Necessity	Certificate of Necessity
1st Year						
Sales	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000	$ 5,000,000
Cost of sales excluding depreciation	3,500,000	3,500,000	3,750,000	3,750,000	4,250,000	4,250,000
Depreciation	100,000	200,000	100,000	200,000	100,000	200,000
Gross profit	1,400,000	1,300,000	1,150,000	1,050,000	650,000	550,000
Expenses	500,000	500,000	500,000	500,000	500,000	500,000
Net profit before taxes	900,000	700,000	650,000	550,000	50,000	(50,000)
Taxes	435,000	329,000	354,500	254,500	23,500	(23,500)
Net profit after taxes	465,000	371,000	295,500	294,500	26,500	(26,500)
Renegotiation refund	300,000	250,000	50,000			
Renegotiation refund tax credit	(135,000)	(105,000)	(21,500)			
Retained profit	865,000	865,000	865,000	294,500	26,500	(26,500)
1st 5 Years						
Net profit before taxes	4,000,000	3,500,000	2,750,000	2,250,000	250,000	(250,000)
Taxes	1,880,000	1,565,000	1,238,500	1,057,500	117,500	(117,500)
Net profit after taxes	2,120,000	1,935,000	1,511,500	1,192,500	132,500	(132,500)
Renegotiation refund	1,500,000	1,000,000	950,000			
Renegotiation refund tax credit	(705,000)	(510,000)	(317,500)			
Retained profit	1,325,000	1,425,000	1,325,000	1,192,500	132,500	(132,500)
Next 5 Years						
Net profit before taxes	4,000,000	4,500,000	2,750,000	3,250,000	250,000	750,000
Taxes	1,880,000	2,115,000	1,238,500	1,527,500	117,500	352,500
Net profit after taxes	$ 2,120,000	$ 2,385,000	$ 1,511,500	$ 1,722,500	$ 132,500	$ 397,500
10 Year Totals						
Total taxes paid	$ 3,055,000	$ 3,250,000	$ 2,467,500	$ 2,585,000	$ 235,000	$ 235,000
Total retained profit	3,445,000	3,750,000	2,782,500	2,515,000	265,000	265,000

Assumptions

1 - 100% Certificate of Necessity, 5 year period, on $1,000,000 of machinery. Normal rate 10%.
2 - Renegotiation to recapture all profit above 10% before taxes.
3 - Renegotiation to be discontinued at end of 5 years.
4 - Constant sales volume $5,000,000 of particular product involved; constant expense of $500,000 per year; constant tax rate of 47%.
5 - Machinery usable for 10 years.

EXHIBIT 2

lowance of the extra amortization in renegotiation, there will come a time when profits and taxes will be larger because of the absence of the write-off, with no renegotiation to siphon off the extra profits and taxes.

These situations could create some interesting results with the final effect determined to a great degree by the extent of profit realized on the products involved. For purposes of illustration, the attached exhibits have been made to portray somewhat extreme conditions. They assume a 100% certificate and a full useful life of ten years, with full utilization of the facilities on similar production when the five years have passed. I believe they do illustrate the possible effects of tax rate changes (Exhibit 1) and discontinuance of renegotiation (Exhibit 2).

RICHARD J. HALLORAN, York Chapter

Coming Articles IN THE **N.A.C.A. BULLETIN**, JANUARY 1952

Weekly Expense Control Can Be Practical
by RICHARD J. HALLORAN

Daily Postings For Fingertip Cost Control
by KENNETH A. BOOS

An Application of Whole Dollar Accounting
by WAYNE B. ARCHERD

The Case for Profit Sharing
by SARTELL PRENTICE, JR.

Another Look at The Natural Business Year
by R. CARSON COX

Programming and Recording Insurance Coverage
by JAMES A. McBRIDE, JR.

A Competence Balance Sheet for the Cost Accountant
by JAMES B. FENNER

Cost System for a Vending Machine Route
by HAROLD H. WHITE

WORKSHOP

Accounting for Repair and Maintenance Supplies
by HORACE J. SMITH

Charging Maintenance Department Costs
by FRANK L. PALMER

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